Green Realities: The Financial Opportunities of Environmentally Sensitive Development in the Commercial Real Estate Development Industry

by

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ABSTRACT

Scientific research has made clear the impacts of the built environment on energy consumption, human health, and greenhouse gas emissions. Despite academic and political advocacy for the widespread adoption of a more environmentally sensitive approach to real estate development, industry practitioners and investors adhere to traditional development techniques due to the financial uncertainty surrounding new development paradigms. A financial argument is needed if developers and real estate investors are to adopt environmentally responsive development practices.

In an attempt to define a financial rationale, this thesis explores opportunities for financial savings and gains as a result of employing environmentally sensitive development practices. Using commercial green development case studies, (1) green building design strategies, (2) environmentally sensitive siting practices, (3) green development incentive programs, and (4) integrated development processes were examined in terms of opportunities for financial gain and development savings potential.

Opportunities for development savings were identified in all four areas. Green building design strategies often result in high indoor environmental quality—increasing worker productivity, reducing absenteeism, and avoiding liability risks associated with building related illnesses and sick building syndrome. Resource efficient urban design strategies can reduce development hard costs, maximize energy cost savings, and decrease revenue risk. Participation in green development incentive programs can yield energy and capital rebates, tax savings, and free technical consulting. Finally, and perhaps the most significant finding of this thesis, integrative development processes reduce community and governmental friction, align project interests, and most importantly, create forums in which building systems can be collaboratively integrated and cost savings can be optimized.

There are financial advantages to undertaking commercial green development projects. Within a grounded, industry context, this thesis presents a preliminary foundation for the financial argument required to convince real estate investors and developers that what is good for the environment is also good for commercial real estate investment.

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Chapter 1

The Context of Commercial Green Development

The built environment has direct impacts on energy consumption, greenhouse gas emissions, and human health. The commercial building sector is responsible for sixty percent of the annual electricity usage in the United States. Furthermore, in 1996 ten percent of greenhouse gas emissions in the US were attributed to energy consumption in commercial buildings. Placing these percentages in a global context, the President's Council on Sustainable Development estimates that the US was responsible for 15 percent of global emissions in 1995 and by 2035, will release 22% of all emissions.[1] Since greenhouse gas emissions promote global warming, the potential to increase global environmental quality through the reduction of greenhouse gases within the US commercial building sector is large. Finally, relating human health conditions to commercial real estate, the US Environmental Protection Agency ranks poor indoor air quality among the top five environmental risks to public health and estimates that building related illness costs US employers $60 billion in worker illness and lost productivity annually.[2]

Commercial green development, or the development of structures that incorporate environmentally sensitive building techniques and building systems, is an attempt to reduce the built environment's negative impact on the natural environment, make commercial buildings more comfortable, and improve energy performance. The concept of integrating ecology and real estate surfaced in the US real estate industry as a fringe topic in the mid- to late-1970s. Addressing issues related to the global oil crisis, early projects integrated passive solar climate systems, natural drainage, environmentally sensitive site planning, and building materials and design techniques that were believed to be ecologically friendly. Although considered technologically advanced at the time, high initial capital costs and the unreliability of experimental building systems steered many investors and developers away from widespread adoption of green designs and building systems.

In light of findings linking the built environment with degradation of the natural environment, encouraging more green development is now more critical than ever. Despite academic and political advocacy for the widespread adoption of a more environmentally sensitive approach to real estate development, most industry practitioners and investors still adhere to traditional development methods due to the financial uncertainty surrounding new development paradigms, such as green development. If developers and real estate investors are to adopt environmentally responsive practices, a strong financial argument is needed. Attempting to define such a rationale, this paper

identifies opportunities within commercial development to realize financial gain by deviating from conventional industry practices. The text to follow posits that taking environmentally innovative approaches to commercial development has significant financial potential. Grounded in case study research and complimenting a solid body of environmental science literature in support of green development, this thesis presents a preliminary foundation for the financial argument required to convince real estate investors and developers that what is good for the environment is also good for commercial real estate development.

Commercial Green Development Defined

In recent years, green development practices have been gaining currency among real estate professionals. Green development continues to be broadly defined, as projects vary in their "green-ness" or environmental sensitivity. For the purposes of this discussion, commercial green developments are projects that take into account how design and site qualities, development and construction processes, and the selection of building materials and systems can deliver buildings with less negative impacts on the natural environment and offer superior indoor environmental conditions as compared to their conventionally developed counterparts.

Understanding Green Development Today

Four main catalysts explain the recent thrust toward environmentally sensitive real estate development. First, advances in green technologies, subsequent increases in technology use, and public environmental awareness have promoted the mainstreaming of environmentally sensitive technologies. The combined effect of government programs dedicated to developing environmentally sensitive technologies and heightened end-user sophistication have increased the availability and demand of green building systems. Further strengthening the demand for technologies that minimize environmental degradation, the majority of US citizens advocate the implementation of state and local environmental standards.[3] Combining pro-environmental public sentiment with strides in technological development and availability, the mainstreaming of innovative environmental technologies is beginning to green the real estate industry.

The second reason for the recent popularity of green development is change in the regulatory environment. Focused primarily on the physical aspects of development and energy consumption, government agencies are employing a variety of measures to reduce the impacts of real estate development on the natural environment. Attempting to minimize environmental degradation

associated with conventional development, zoning and building codes now address siting, infrastructure demands, watershed, and the preservation of microhabitats through a number of restrictions and financial incentives. In addition to the impacts of new developments on surrounding contexts, governments are also concerned with building efficiency. State and local energy consumption standards for building systems are becoming more stringent. As system manufacturers anticipate or respond to energy consumption regulatory standards, developers are, as a result of availability, replacing older systems with higher performance, energy-efficient systems. At both the system and site level, government policy has the potential to require a more environmentally sensitive approach to development.

The third reason for the recent popularity of green development is the realization of energy cost savings. Capitalizing on both the financial savings from new energy conserving fixtures and the incentives offered by governmental agencies and utility companies, developers are beginning to realize substantial savings from energy reduction initiatives. Approaching energy-conserving retrofits as investments, building owners are experiencing attractive returns and relatively short payback periods as compared to traditional corporate expenditures. Owners are profiting as energy costs and operating costs fall. In recent years, a growing body of system specification and research literature supports the ability to achieve increased net operating incomes, and therefore increased asset values, as a result of energy efficient retrofits and programming.[4]

Finally, the fourth driver behind recent green development attention is the impact of indoor environmental quality on increase worker productivity, building related illnesses, and worker productivity. Commercial developers and owners are increasingly finding themselves held responsible for health complications and productivity losses caused by building systems and materials that compromise the quality of the indoor environment. Combining reductions in absenteeism as a result of cleaner buildings with research demonstrating real productivity gains as a result of daylighting and other design schemes, businesses are beginning to realize the advantages of environmentally sensitive buildings over conventional office buildings.

Targeted Research Missing

With the exception of a few publications, most of the current writings on green development lack the appropriate audience focus to inspire widespread adoption in the development industry. By frequently ignoring the primary facilitators of change in the development industry—developers and investors—much of the literature on environmentally sustainable development does not facilitate the mainstreaming of green development.

By focusing on improving aspects of the traditional development process instead of promoting green development as a grounded, new process, current green development literature overemphasizes the piecemeal application of new technologies. This focus on technology fails to adequately educate developers and investors about how to approach buildings as a series of interconnected systems—thereby *optimally* integrating new technologies. Adopting a green development approach has the potential to concurrently maximize projects' financial, environmental, and social outcomes.

Additionally, the literature supporting green development does not address the concerns of developers. While changes in technology, regulatory incentives, and energy cost savings are all sound reasons for implementing green development strategies, the majority of published information fails to inspire an industry adoption because of the subjective and sometimes emotional tone in which the information is presented. In conducting a literature review on topics ranging from finance to system technology, if information can be found, it is often framed in a vague, value-based argument that has little direct applicability to industry professionals. Instead of providing developers with the information to make informed decisions, the literature focuses on exposing how developers can embody their espoused environmental values through green development—a focus that may incorrectly assume developers have environmental values. Slighting issues with which developers are traditionally concerned, such as investment returns, project management, and approvals processes, attention is directed to topics such as the "social correctness" of community participation in the development process. The existing literature does a poor job of relating green development topics to financial and development concerns.

A Tailored Approach

Focusing on commercial office developments, the text to follow offers insight as to how developers can increase development and ownership revenues by capitalizing on value-adding green development strategies. Specifically, this thesis explores how developers can realize savings and gains by creating increases in tenant productivity, selecting sites that reduce environmental impact, participating in programs that promote green development, and by rethinking the development process. This thesis does not take issue with developers' and real estate investors' systems of values, but rather assumes that given sufficient financial opportunities, developers and owners are interested in capturing development savings through the use of green development strategies.

Before continuing this discussion, it is important to define "value-adding green development strategies" and "improved development and ownership revenues." Value-adding green development strategies are environmentally sensitive departures from conventional commercial development approaches to siting, development processes, and building systems. Improved development and ownership revenues refer to development savings and increases in net operating income over conventional development savings and revenues as a result of employing green development strategies. Increased revenue may be achieved in several ways:

- Development time cost savings—A green development approach may reduce the time it takes to obtain plan approvals, secure financing, and receive occupancy permits.
- Liability savings—Environmentally sensitive commercial building systems can avoid risks related to occupant health liabilities by providing spaces of high environmental quality.
- Utility and capital expenditure rebates—Commercial developments that employ energy saving technologies are often eligible to receive service and system rebates from utility providers.
- In-kind development assistance—There are a variety of programs that offer incentives to undertake green commercial projects. Programs provide developers with valuable financial incentives and complimentary technical assistance that can reduce first costs and operating costs.
- Rent premiums for green commercial space—By passing operating cost savings through to tenants, owners can benefit from increased revenue without changing their tenants' effective rent rates.

Methodology

This thesis is based on the conclusions drawn from an extensive literature review, the findings of over 45 commercial green development case studies, and personal interviews with developers, architects, and incentive program administrators. Approaching development as a multidisciplinary field, real estate, financial, policy, architectural, engineering, environmental science, and government publications were used to provide information on incentive programs, development processes, site design, and productivity. Case studies were conducted by the Rocky Mountain Institute, the US Department of Energy, the US Green Building Council, Public Technology, Inc., and the US Environmental Protection Agency on projects completed between 1983 and 1999.

The Chapters

This thesis argues that development savings and increased revenue can potentially make commercial green development more financially attractive than conventional commercial development. Looking at aspects ranging from building-scale qualities such as the design of space to broader issues such as the development process, the chapters to follow make explicit the financial opportunities of employing innovative environmental technologies, principles, and processes. Beginning with a discussion of how to increase productivity through the selection of building systems and concluding with an integrated green development cost saving strategy, this thesis presents a series of arguments for green commercial development ranging from system selection to the development process.

Chapter two focuses on how developers can increase productivity through the design of space and the programming of building systems. Looking at productivity enhancement as a process as well as an outcome, this chapter outlines design elements research has shown to boost worker productivity, workplace efficiency, employee morale, and improved indoor environmental quality. Translating increases in productivity into financial returns, chapter two concludes with an explanation of how owners can capture the financial benefits of high-productivity spaces.

Chapter three identifies environmentally sensitive urban design and site characteristics that offer financial gains. Identifying elements of the built environment that are important to office tenants, developers, and development officials, this chapter covers issues ranging from land use considerations to site programming. Chapter three concludes with a set of design guidelines and considerations for commercial green development.

Chapter four investigates voluntary programs that reward commercial green development efforts. Development-related programs can promote and expand green development opportunities by providing development incentives and technical assistance. In addition to reviewing and evaluating existing programs, this chapter analyzes recent trends in development policy and explores potential future development programs.

Chapter five examines how front-loading the development process and including diverse stakeholders can lead to project savings. Focusing on the green development process, a process that requires a variety of parties be included in the early stages of project planning, this chapter identifies key areas within the development process where stakeholder participation can have a positive impact on overall project success. A front-loaded, inclusive development process can lead to valuable time savings, facilitate approvals flexibility, and create projects valued by tenants and the surrounding

community. Most importantly, integrated development processes amplify the sum of the savings associated with green design principles, land use strategies, and development incentive programs beyond cumulative savings. The collaborative, front-loaded development process is the junction where building system synergies can be maximized and total development and ownership savings can be optimized.

Chapter six distills the findings from earlier chapters into guidelines for commercial green development. Unlike hierarchical guidelines associated with conventional value-engineering approaches, addressing buildings from a whole systems perspective yields a set of mutually reinforcing strategies that emerge out of an integrated process. Based on the research in previous chapters, the proposed guidelines are designed to maximize the financial benefits of an integrated green development approach. Placing the findings of this thesis in an industry context, chapter six concludes with an explanation of why green development has not been adopted as standard practice and suggests solutions for the mainstreaming of green development.

Notes

[1] President's Council on Sustainable Development. *Towards a Sustainable America: Advancing Prosperity, Opportunity, and a Healthy Environment for the 21st Century* (Carbondale, IL: EarthPress, May 1999), 25-32.

[2] US Environmental Protection Agency, as quoted in Peter A.A. Berle, "Take a Tour of this Building and Save," *The New York Times*, (6 June, 1993): F13. Also see B. Lippiatt and G. Norris, "Selecting Environmentally and Economically Balanced Building Materials," *National Institute of Standards and Technology Special Publication 888.* (Second International Green Building Conference and Exposition, 1995).

[3] Barry S. Shanoff, "Environmental Survey Supports State/Local Role," *World Wastes*, (October 1996, vol.39: 10): 18-20.

[4] Roger Hill and Helen Kessler, "Increasing Property Value through Efficient Energy." *Environmental Design and Construction*, (May/June 1999): URL http://www.edcmag.com/archives/5-99 (18 June 1999)

Chapter 2

Environmental Building Design: Increasing and Capturing Productivity Gains

This chapter focuses on how developers can use the design of space and the programming of building systems to create buildings where space is used more efficiently, workers are more productive, workplace morale is elevated, and system loads are reduced—all of which have financial implications. While most of the early environmentally sensitive commercial projects incorporated green design and systems to decrease energy costs, recent findings show that increases in productivity provide a more substantial financial justification to undertake green development initiatives.[1]

The concept of increasing worker productivity and enhancing workplace efficiency through the use of green design can be presented in both qualitative and financial terms. Due to the inclusive way in which commercial green buildings are designed and their high indoor environmental quality, green buildings are believed to elevate employee satisfaction, reduce absenteeism, and improve worker accuracy and output quality. Because these variables are often difficult to isolate and quantify, the research to date is predominantly qualitative but has clear financial implications. For example, looking at employee satisfaction, there are a variety of issues that could have both long-term and short-term effects on the sustainability of corporate successes. In the short-term, tenant satisfaction can have a direct impact on turnover rate, and hence, the use of building owners' resources related to releasing costs. Surfacing at a more critical level, long-term benefits of tenant satisfaction include the retention of major tenants and continued building demand.

This section explores the connections between green commercial building characteristics and increases in tenant satisfaction and productivity. Factors impacting productivity are discussed in terms of building design and system selection. Most importantly, relating this design oriented chapter back to developers and owners, this chapter culminates in a discussion about how productivity enhancements translate into bottom line savings and how both developers and tenants can capture these savings in the development of commercial green buildings.

Designing Effective Workplace Environments

In a survey aimed at understanding the design and environmental factors related to worker and office productivity, the Buffalo Organization for Social and Technical Innovation (BOSTI) identified 18 "facets" of office space that relate to employees' productivity and other bottom line measures. Of these facets, lighting, building enclosure, and spatial layout have a direct impact on job performance. Lighting, air quality, noise, flexibility of space, participation in design, thermal control, appearance, and way-finding are related to employees satisfaction with both their jobs and their work environments.[2]

In a similar study by J.C. Vischer applying a "building-in-use assessment" approach to analyze office environments, workers were surveyed about the spatial comfort, noise control, thermal comfort, lighting comfort, privacy, and air quality in their offices. Using a regression model to test productivity, research found spatial comfort and noise control as the most important factors for both worker satisfaction and productivity (R^2=0.39 and R^2=0.25, respectively). Not surprisingly, air quality was found to have the largest impact on worker illness.[3]

Lighting Strategies for Productivity

As the single most significant factor in creating comfortable and productive workspaces, efficient, tailored lighting can measurably increase work quality and overall productivity through the reduction of worker errors, manufacturing defects, and eyestrain.[4] Daylighting, or the introduction of natural light into the interior of a building, is a major consideration in the design of green buildings. Relating daylighting to increased morale and productivity, many European building codes require that all workers have access to natural light. As green buildings commonly incorporate daylighting schemes into the building system program, tenants in green buildings can enjoy increased worker productivity and improved morale.[5]

In recent years, many corporations have taken advantage of energy efficient rebates from utility companies and converted conventional lighting systems to systems that combine natural light with supplemental, high-quality artificial light. While the initial objective of lighting upgrades is to decrease energy consumption costs, energy savings are often eclipsed by increases in worker productivity. As architect Bruce Coldham reported, "the payback on energy savings is impressive, but directly attributable productivity improvements can be an order of magnitude more."[6] Through the use of daylighting strategies such as light shelves, high-performance glazing, and passive solar intake systems, commercial tenants have reduced absenteeism by 15% and boosted productivity by 6%-16% per year.[7] This increase in productivity as a result of daylighting is applicable to both national and international contexts,

as there was an observed 15% reduction in absenteeism at the Lockheed Corporation's Building 157 in Sunnyvale, California as well as at the NMB Bank in Amsterdam.[8]

Windows

Strategically placed windows and skylights are commonly used in green buildings to improve daylighting and capitalize on energy savings.[9] Insofar as windows are the primary means by which natural light is diffused into the interior of the building, they are extremely important when designing to increase productivity and employee satisfaction. That said, the proximity to windows or presence or absence of windows in individual workspaces may have "limited effects" on employee satisfaction and productivity.[10] This finding, although unintuitive, provides greater flexibility in the design of green buildings, as design professionals can focus on the quantity and quality of natural light in interior spaces instead of the positioning of windows in relation to occupied spaces. In addition to window location, the ability to open windows increases air circulation, potentially reducing HVAC loads, and may have significant health and satisfaction benefits for tenants.

Artificial Lighting

According to a 1995 Louis Harris poll of over 6,000 US workers, eyestrain is the most prevalent health hazard in the work environment—a hazard that diminishes worker productivity.[11] Although a variety of factors contribute to eyestrain, redundant and poorly designed artificial lighting systems are the primary source of visual discomfort. In designing and programming green commercial buildings, the development team has the opportunity to reduce energy costs and enhance worker productivity by eliminating excessive and poorly directed artificial lighting.[12] Combining ambient and task lighting at levels determined by worker demands improves individual working conditions and can reduce energy consumption by up to 70%.[13] Energy efficient technology such as electronic dimming ballasts, fixture-mounted lighting controllers, and automatic optical reflectors and louvers serve to automate illumination based on worker preferences while conserving electricity in unused spaces.

The direct impact of lighting on worker productivity has been a topic of debate since Western Electric's "Hawthorne experiments" in 1924. More recently, some researchers have argued that while a sensitively designed lighting system may not conclusively lead to significant increases in productivity, a poorly designed lighting system is likely lead to adverse worker health and reduced satisfaction.[14] Because most lighting systems in the US's aging stock of commercial properties are not energy efficient and no longer address

specific worker tasks, it is not unreasonable to assume that redesigning the outdated lighting systems will increase worker productivity. Furthermore, even if productivity gains are not attributable to increases in lighting quality, some experts argue that productivity will increase due to "perceptions of the (new) lighting's general aesthetic qualities and the symbolic role lighting plays."[15]

While studies have shown that morale and productivity gains attributed to sensitively designed lighting systems justify the initial costs, many commercial tenants and building owners fail to upgrade lighting systems. Instead of evaluating new lighting schemes as a capital expenditure, research implies well-designed, high-performance lighting is an investment. The projected payback periods for upgraded artificial lighting systems are surprisingly short (one to three years) due to lower energy consumption. When considering savings from increases in productivity, technology rebates, and longer system lifecycles, lighting upgrades are even more attractive investments.

Indoor Air Quality and HVAC Performance

There is a strong link between indoor air quality (IAQ) and building related illness (BRI). In response to the 1970s oil crisis, many office buildings were sealed to increase energy efficiency. While making buildings more air-tight resulted in reduced energy waste, the use of toxic chemicals in finish materials and a lack of fresh air ventilation promoted the collection of harmful chemicals in HVAC systems that now greatly compromises IAQ—sometimes making indoor air up to 100 times more polluted than outdoor air. The US EPA ranks poor indoor air quality among the top five environmental risks to public health[16] and estimates that building related illnesses costs US employers $60 billion in worker illness and lost productivity annually.[17]

The selection of an appropriately scaled and tailored HVAC system can have impacts on energy consumption and air quality. In commercial buildings, HVAC systems are responsible for 40 to 60 percent of total energy use. One study, looking specifically at the impacts of a high-performance HVAC system for a large, 8-story tenant in an office tower, found that the creation of performance standards (ventilation rates, maintenance schedules, monitoring systems) resulted in a 50% to 70% reduction in the concentration of volatile organic compounds (VOCs). One year later, the tenant reported a decrease in absenteeism ranging from 6% to 10%.[18] In controlling IAQ, the use of higher performance HVAC systems that incorporate, filter, and clean fresh air further increase productivity through the reduction of worker illness and absenteeism. A primary cause of worker health problems, new buildings should be programmed with HVAC systems that provide large quantities of filtered, fresh air and limit VOC and chemical exposure.

Capturing Tenants' Productivity Gains

In a study by the City of New York, researchers found that the savings from a one-percent gain in productivity as a result of reduced absenteeism in green buildings translate into annual operating savings of about $2.00 to $5.00 per square foot of space. [19] While the exact savings per square foot depends employee and operating costs, the logic behind these calculations provides a simple way to understand the financial magnitude of productivity gains. The City of New York started to derive this per square foot savings by classifying their real estate portfolio into two categories: office space and service/facilities maintenance space. Dividing the sum of City workers' salaries that occupy these spaces by the gross square feet per category, researchers found a cost of $200 per square foot of office space and $500 per square foot of service/facilities maintenance space. Introducing a one-percent savings per employee due to productivity increases, researchers arrived at a savings of two dollars per square foot of office space and five dollars per square foot of service/facilities maintenance space.[20]

Similar case studies by the Rocky Mountain Institute (RMI) and the US Department of Energy (US DOE) found productivity increases ranging from 6% to 16%.[21] The study notes that while energy cost savings are often the guiding motivations behind retrofitting and redesigning interior lighting and HVAC systems, the financial gains attributable to increases in productivity, reduced absenteeism, and worker accuracy far outpace energy savings.

The RMI/US DOE study *Greening and the Bottom Line* analyzes a lighting upgrade by Pennsylvania Power & Light as an example of where a higher-quality work environment led to an increase in worker productivity. By tailoring the task and ambient lighting in their drafting office to minimize veiling reflections, Pennsylvania Power & Light cut energy costs by 69% and reduced annual operating costs by 73%. The productivity effects of the lighting upgrade decreased absenteeism by 25% and reduced the average hours drafters spent on drawings from 6.93 hours to 6.15 hours—a 13% gain in productivity worth $42,200 annually. The payback period from just the energy savings was estimated at 4.1 years. Considering productivity gains, the investment payback was reduced to 69 days.[22]

In evaluating the financial potential of productivity gains, RMI/US DOE concluded that although energy cost savings and system upgrades are important—a one-percent increase in productivity in an office environment where space costs $21 per square foot translates into savings 72 times greater than annual energy costs on a per square foot basis. Citing over a dozen case studies in RMI publications, small increases in productivity generate greater savings than large reductions in energy consumption. As William Browning (RMI) and Joseph Romm (US DOE) stated in their findings on workplace productivity gains, "a 1% increase in productivity is

approximately equal to the entire annual energy costs (of a commercial building)."[23] As with any investment, issues of scale should be considered in evaluating productivity improvement in commercial green development.

Applying a variation of the methodology used by the City of New York to calculate productivity savings, figure 2.1 provides a simplified example of the effect of a conservative six-percent productivity gain (or a six-percent reduction in absenteeism) in a 100,000 square foot office building. If developers and building owners are able to design workspaces in such a way as to promote increased productivity, it is not unreasonable to expect an annual savings of over $1 million. In other words, by integrating productivity enhancing elements into the building design and program, owners can expect that tenants will be six percent more productive, which, using the method below, translates into additional $1 million dollars of production at the building level.

Figure 2.1

PRODUCTIVITY SAVINGS
Based on a typical 100,000 sq. ft. office building

Utility Costs	
Annual Utility Cost per sq. ft.	$ 1.80
Total Annual Utility Cost	$ 180,000
Personnel Costs	
Average Employee Salary + Benefits	$ 35,000
Average Employee Space (sq. ft.)	200
Estimated Number of Employees in Building	500
Annual Average Personnel Cost per sq. ft.	$ 175
Total Annual Building Personnel Cost	$ 17,500,000
Savings	
Value of 6% Productivity Increase per sq. ft.	$ 10.50
Total Annual Value of 6% Productivity Increase	$ 1,050,000
Ratio of Productivity Increase Value to Utility Cost	6 : 1

Source: Author's application of method adapted from Gottfried (1996).

A different way to understand the impacts of productivity gains is to evaluate the differences in a firm's output. While this approach assumes that all firms face inelastic demand for their services and that firms choose to expand their output instead of reduce their employee base in light of newfound efficiencies, this method further magnifies the potential impact of increases in productivity on the bottom line. Figure 2.2 is an example of measuring the effect of an increase in firm output as a result of a six-percent increase in productivity.

Figure 2.2

PRODUCTIVITY GAINS (Output)
Based on a typical 100,000 sq. ft. office building

Utility Costs

Annual Utility Cost per sq. ft.	$ 1.80
Total Annual Utility Cost	$ 180,000

Firm Costs and Output

Average Employee Salary + Benefits	$ 35,000
Estimated Number of Employees in Building	500
Average Annual Gross Output (20% overhead)	$ 21,000,000
Average Output per Employee	$ 42,000

Gains

Value of 6% Productivity Increase per Employee	$ 2,520
Total Annual Value of 6% Productivity Increase	$ 1,260,000
Ratio of Productivity Increase Value to Utility Cost	7 : 1

Source: Author's application of variables presented in Gottfried (1996).

Case studies are quick to point out employee productivity gains but fail to give examples of how building owners can share in the benefits they create. While the basic accounting methods used in figures 2.1 and 2.2 provide a strong initial understanding of the magnitude of potential increases in productivity, they do not directly address the question of how building owners can capture tenants' productivity-enhanced revenues. Many owners only see increases in tenant productivity as only benefiting tenants' bottom lines. In order to make productivity enhancing investments worth their effort, developers and building owners must be able to capitalize on their tenants' productivity gains. One viable method of capturing productivity gains is through the use of a performance lease.

Similar to a retail lease, performance leases enable both the tenant and the owner to benefit from productivity-enhancing environments. In negotiating lease contracts with tenants, owners executing performance leases can share in their tenants' productivity gains by measuring observed productivity against a predetermined level of output. While agreeing upon benchmarks and measuring productivity can be complicated, the performance lease is a vehicle by which building owners can benefit from productivity-enhancing green design.

Figure 2.3 demonstrates how tenant revenue increases as a result of building enhancements can be allocated between tenants and owners.

Figure 2.3

CAPTURING PRODUCTIVITY THROUGH PRODUCTIVITY PERFORMANCE LEASES
Based on a typical 100,000 sq. ft. office building

Standard Lease

Annual Rent per Square Foot (triple net)	$ 21.00
Annual Net Operating Income (NOI) under Standard Lease	$ 2,100,000
Asset Value under Standard Lease (capitalized at 10%)	$ 21,000,000
Original Tenant Production (assuming 500% of annual rent)	$ 10,500,000

Performance Lease

Annual Base Rent per Square Foot (triple net)	$ 21.00
Enhanced Tenant Production (assuming a 6% increase)	$ 11,130,000
Performance Lease Income (50% of prod. increase over 3%)	$ 315,000
New NOI under performance Lease	$ 2,415,000
New Asset Value under Performance Lease (cap. at 10%)	$ 24,150,000

Owner Gains and Tenant Savings

Increase in NOI as a result of Performance Lease	$ 315,000
Percentage Increase in NOI and Asset Value	15%
Effective Rent per Square Foot (Under Performance Lease)	$ 17.85
Effective Annual Rent (Under Performance Lease)	$ 1,785,000
Percentage Decrease in Effective Rent (Under Performance Lease)	15%

Source: Author's application of variables presented in Browning and Romm (1998).

Despite the simplicity behind the concept of a productivity performance lease, they are rarely used in leasing green commercial buildings because of the complexities associated with defining performance benchmarks and outcomes.[24] The first problem building owners face is how to weigh productivity in a green building against productivity in a conventional building. While this complication can be overcome by examining past firm output or absenteeism data, some firms may be new or moving into vastly different spaces. The lack of a basis for comparison will most likely lead to arbitrary performance targets where building owners are at an informational disadvantage. Related to quantifying productivity gains, the complexity and the potential risks associated with performance leases present further hurdles to wider-spread use. While it is reasonable for building owners, the financiers of productivity enhancing elements, to benefit from their tenants' increases in output, performance leases must also address what happens if tenants' productivity decreases or there is a non-building related illness that impacts tenants' productivity. A high level of sophistication, including an understanding of tenants' output potential, is necessary to successfully deliver performance leases. Finally, building owners do not know whether or not there is a market demand for a performance lease that has the potential to make tenants and building owners better off. When vacancy rates are low and space is in demand, the performance lease may be a competitive mechanism to allure sophisticated tenants and allow them to save on rent. Alternatively, in a down market with rising vacancy rates, the performance lease may be too time consuming and complex to negotiate despite its potential to lower effective rents.

Putting the above discussion in perspective, the complexity of performance leases should not be prohibitive. Rather, because case study and design-related productivity research does not expose the obstacles inherent in productivity-based performance leases, it is important to outline the challenges building owners may face in capturing the productivity-benefits they create. As energy-related performance leases have been executed in a variety of green projects, including MERRIT's Continental Office Towers (chapter five) and Kalke's 2211 West Fourth development (chapter three), some green developers are learning how to use new lease structures and improve revenues for themselves and their tenants'.

Maximizing the Value of Productivity and Energy Retrofits

The quality of indoor air and energy efficiency in retrofit projects is a consideration that does not often surface in productivity-related green development case studies. The facility of technical consultants and the depth of the retrofit can have large impacts on the value of implementing environmentally sensitive principles and systems geared at increasing productivity, indoor quality, and energy efficiency.

Achieving the full value of productivity-related features and energy savings is dependent upon the technicians' levels of expertise and project commitment. While this is an intuitive point, environmental building research does a poor job of pointing out the importance of selecting highly capable technicians and designers. In discussing his experience with the effectiveness of his contractors for the Denver Dry Goods Building redevelopment, Jonathan F.P. Rose stated:

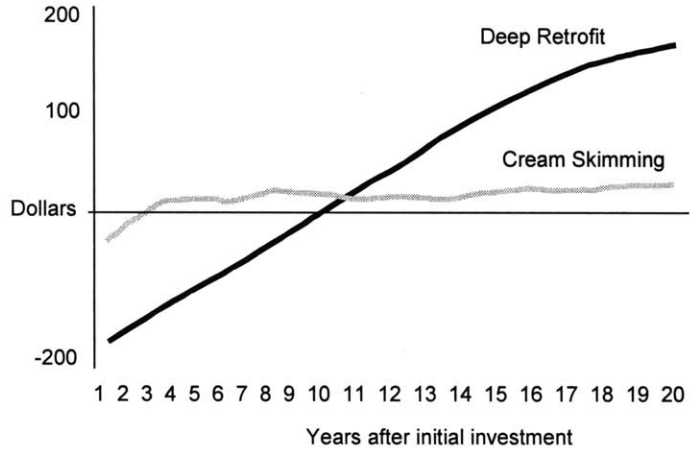
> "Unfortunately, we had a mediocre mechanical engineer... (and the building) was initially commissioned poorly. Then we brought on a new building engineer who fine-tuned everything and made a big difference. Our best energy savers have been retrofits. If you feel the mechanical engineer is not sympathetic from the start, replace them as soon as possible..."[25]

Due to an unsympathetic mechanical engineer, the energy saving features with the greatest impacts were added up to six months after project completion. Depending upon the scale of the building, such a retrofit undertaking could come at significant cost to the developer—especially when such costs could have been avoided. Developers and owners' representatives must coordinate the creation of a design team that understands the value of approaching the building as an interconnected system of architectural and engineering features in order to maximize the benefits of green building design elements.

The use of performance-based fee (PBF) contracts can help owners avoid poor contractor performance and ensure designers and engineers work as an integrated team to address design issues and energy and cost savings.[26] The concept behind PBF contracts is simple. The design team receives bonuses for exceeding target energy savings and pays a penalty if energy efficiency falls short. Performance based fee contracts require teamwork and effectively align the interests of the design team with the interests of the owner.

Figure 2.4 "Deep" Retrofit versus "Cream Skimming" Savings

(Goldberger, *Profiting from Energy Efficiency*, 1994.)



The depth of the retrofit is also a major factor in the performance of the indoor environment. In evaluating commercial retrofits, all projects can be divided into two main categories: integrative or "deep" retrofits and system or "cream skimming" retrofits. Cream skimming or system retrofits are investments in low-cost or piecemeal strategies with short payback periods (e.g. high-efficiency lightbulbs). While these are attractive investments from a payback perspective, cream skimming projects often have a lower impact on the indoor environmental quality and limit long-run energy savings relative to more integrated retrofits. Conversely, "deep" or integrative retrofits are more extensive projects that dynamically incorporate several green building systems and strategies at considerably higher initial costs (e.g. passive solar heating/cooling and reflective roof materials). As shown in figure 2.4, there are increasing economies of scale in implementing environmentally sensitive design and system strategies.[27] This finding obviously has implications for developers and building owners, as the more they are willing to invest on productivity-enhancing indoor environmental quality strategies, the greater the long-term benefits.

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Chapter 3

Creating Valuable Places: Maximizing Demand and Project Savings by Location

This chapter identifies how environmentally sensitive urban design and site decisions can result in financial gains. The issues in this chapter range from where to site buildings to how to program their uses. The design considerations to follow are not radical departures from current practice. Rather, they are long-established, common sense urban design related decisions with implications that are often not fully understood by developers. At the intersection of urban design and real estate development, this chapter links financial performance with sound land use principles.

Employing environmentally sensitive design considerations within the built environment presents an opportunity to integrate design and development strategies to determine the most appropriate site use and program, capitalize on the current resources of the site, and maximize operational efficiencies. Additionally, urban-scale planning incorporating environmental principles can have impacts on asset value. Thinking about the interconnectedness of the locational amenities, adjacent land use concentrations, and economic viability, developers and owners should critically examine how to maximize location and site values. The implementation of sound urban design principles are more than public externalities—they have the potential to have direct financial impacts on building owners, developers, and property managers.

Locational Amenities: Tenants Demand More

All office buildings are not created equal. When searching for office space, tenants select space that most satisfies their package of space needs. As differences in location, floor area, space flexibility, building prestige, and access make commercial spaces imperfect substitutes, tenants shopping for space must constantly make trade-offs—failing to meet some criteria in order to satisfy needs of greater significance. A classic example of this compromise frequently occurs when lease term and rental rates are negotiated: In exchange for lower space costs, tenants often sign extended leases. While superficial issues such as lobby finishings and financial issues such as rents and lease terms have historically dominated lease negotiations and tenant attraction, research by the Urban Land Institute (ULI) and the Building Owners and Managers Association International (BOMA) suggests tenants' space criteria are changing. With interests shifting away from the

image-centered qualities popular in the 1980s, tenants now place higher value location-related amenities when shopping for office space.[1]

In a 1999 study by ULI and BOMA International, 87% of the 1829 tenants surveyed report their proximity to business services as "very important" or "important." Similarly, 81% of employers value being in close proximity to their employees. Acknowledging the relationship between business and lifestyle, tenants note the importance of proximity to restaurants, retail, personal services (81%) and banking (70%). On the aggregate, 69% of tenants report that access and proximity to public transport is important.[2] Tenants' preferences for location-based amenities, or qualities of place, could be interpreted in a variety of ways. From the information available, it seems tenants now emphasize location and service amenities in selecting office space.

Findings suggest that tenants favor moderately dense environments. The fact that 87% of the surveyed tenants place a high value on their proximity to business services suggests the importance of a minimum density, or concentration of businesses. The significance of supplying office space within a somewhat dense context, as reported by a statistically significant sample of tenants, suggests that future demands for isolated campus settings may be exceptions in commercial development.

The value of a dense location is further implied by employers' desire to be near to their employees. Office buildings located in proximity to residential neighborhoods are favorable to tenants and their employees alike. Increasing employees' proximity to work reduces commute distances and times and, in some cases, decreases the need to drive. Tenants recognize the time and operating costs incurred by their employees and evaluate these costs when determining employee wages and benefits.[3]

Tenants' desire to be close to restaurants, retail, personal services, and banking highlight the convenience and time-saving benefits of mixed-use districts. By occupying buildings located in mixed-use areas, tenants are closer to service contractors, can easily entertain clients, and benefit from a mix of convenience services that satisfy employees. For a mix of uses to be economically viable, it is often necessary they be located within moderately dense districts. Mixed-use and dense developments are mutually reinforcing land use strategies.

Finally, commercial tenants value access to transportation. Congruent with tenants' strong preferences for dense, mixed-use locations, 69% of tenants rate proximity to public transportation as "important" or "very important. This 69%, however, is an aggregate percentage; just as on average only 52% of the surveyed tenants are located in central business districts (CBD). While

the study does not differentiate between urban and non-urban tenants in reporting locational preferences, it does note that communications firms, legal firms, and non-profit tenants represent the majority share of CBD survey respondents. When looking at these three industries, public transportation is important to 80% of CBD tenants. The suggestion that CBD tenants value public transport more than tenants as whole makes perfect sense, as public transport is most effective and efficient in high-density areas where there are high costs associated with private automobile travel.

From Locational Amenities to Qualities of Place

Extrapolating from the above interpretations, three urban design qualities effect tenants' demand for office space. The demand for density is the first and most consistently valued characteristic. While it is unclear what tenants' define as an optimal density, their preferences for diversified services and amenities suggests urban qualities. Secondly, tenants value a variety of uses over single-use developments. Placing a high value on proximity to employees and the ability to work, shop, and entertain near their offices, tenants' implied definition of mixed-use development suggests the need for an integrated, network of services and uses. Finally, access to public transportation is a significant consideration. For urban tenants, access to an efficient public transportation system can lower travel costs for employees and clients and reduce the need to supply employee parking. By understanding these interconnected tenant location preferences, commercial developers have the ability to select sites tenants demand.

Density

Development density is intimately tied to environmental quality. While some argue that high density urban environments promote energy waste, congestion, and excessive infrastructure demands, research suggests otherwise. From a land use perspective, increased development densities can be understood as a sprawl combattive strategy. As stated in a 1995 report by Bank of America et al, the environmental costs of sprawl include increased transportation and construction emissions (air pollution), a scarcity of native or undeveloped landscape (endangered species and water pollution), and excessive resource consumption (fossil fuels and energy waste). The financial costs of sprawl include higher direct costs to offset the negative effects of low density land use patterns (taxes), geographical mismatches between workers and jobs (higher labor costs and lost productivity), extended freight and commuting times (time costs), and the potential for land values to decline as newer communities are built (market risk).[4] On the contrary, densification minimizes the development of raw land,

improves water quality by reducing the area of impervious surfaces, and reduces vehicle miles traveled to outlying areas. High-density development may actually increase the immediate and regional air quality and improve the resource consumption efficiency of land and materials related to traditional transport and development practices.[5]

From a real estate perspective, commercial developments in areas of moderate densities are attractive investments. By taking advantage of existing street networks, utilities, and sometimes steam and gas service, developers can avoid significant conduit and road construction costs in dense areas.[6] Further supporting developments of higher density, some public redevelopment agencies reward developers that maximize the utilization of public facilities and services.[7] Additionally, development density could have implications on the financial success of commercial buildings. By creating districts with high concentrations of office space, building owners can benefit from a critical mass of development and potentially ride-out small fluctuations in the space markets.[8]

Mixed-Use Development

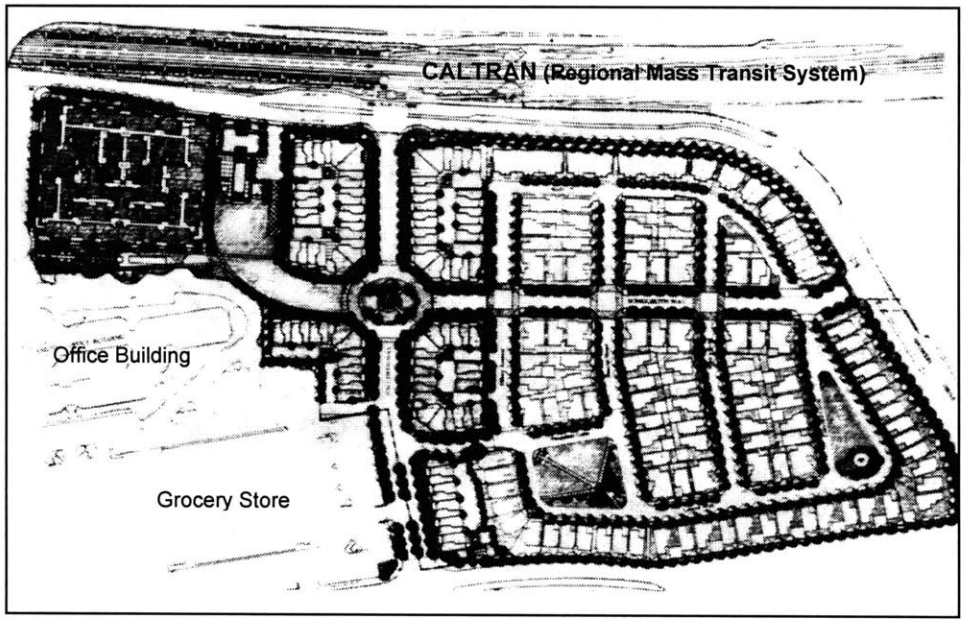
Development schemes that incorporate office, residential, and retail uses provide immediate resources to the community, are more robust in times of economic fluctuation than single-use developments, and can benefit from diversified streams of income.[9] Reducing the impacts on the natural environment, mixed-use developments reduce transportation-related emissions by minimizing single purpose trips, promote pedestrian travel over automotive travel, and use land more efficiently than under traditional, use-segregated Euclidian zoning conventions.[10]

Mixed-use developments are attractive investments for two concrete reasons. First, programmed correctly, mixed-use developments can introduce efficiencies in the use of mechanical systems and support facilities—ultimately reducing capital and operating costs.[11] At the building scale, designing commercial and residential developments to share mechanical systems eliminates the need for parallel systems and reduces system peaking.[12] Using waste heat from commercial spaces to heat residential water supply is an example of system minimization. At the district level, support areas that are often vacant during off-peak hours, such as parking areas and common spaces, can be used more efficiently. By creating spaces that share systems or uses, commercial and residential programs can be combined using less space than they would require individually—allowing the developer to build more leasable space or more compact developments and leave some land undeveloped.

Additionally, mixed-use commercial developments can be considerably less risky than single-use developments.[13] Developments can consciously tailor a mix of uses to target particular audiences seeking complimentary goods and services. Benefiting from multiple streams of income, mixed-use building owners can substantially lower revenue risks. Extending the notion of risk diversification benefits beyond the actual mix of uses, revenue streams can be further diversified by programming uses to operate around-the-clock. Twenty-four hour mixed-use developments promote social interaction, add to the success of public spaces, minimize redundant mechanical costs, and increase location desirability.

Transit-Oriented Development

In order to sustain dense, mixed-use commercial districts, it is important to provide efficient access and mobility to commercial properties. Due to the grid-like nature of most US urban centers and mass transportation system requirements, combining a dense mix of uses with transit most often results in a corridor of development. The concept of purposefully designing and creating high-density corridors, often referred to as "transit oriented developments (TODs)," is most often associated with the new urbanism movement.[14] Transit oriented corridors are "tightly woven communities that mix stores, housing and offices in a compact, walkable area surrounding a transit station."[15] In general, TODs are communities or urban villages within a 2,000-foot average walking distance to transit facilities. Minimizing automobile related emissions and maximizing mobility, commercial developments sited within high-density corridors served by mass transport provide tenants with efficient, low-cost, environmentally friendlier access to their offices.[16]



Designed by Calthorpe Associates, the Old Mill Neighborhood is a transit-oriented development in Mountain View, CA. All residences are in walking distance to conveniences and mass transit. (Courtesy of Calthorpe Associates, 1999.)

Beyond the environmental and commuting benefits, siting commercial buildings within dense corridors served by transit can have financial implications. Developing in areas served by transit can reduce development costs associated with congestion impacts and automobile infrastructure. If transit level-of-service, a concept incorporating the monetary and time costs of commuting, is greater than or equal to the level-of-service provided by personal automobile travel, it can be assumed that transit is a viable mode of commuting for building occupants. Because the availability and frequency of transit service throughout urban areas can vary considerably, zoning requirements for parking and roadway upgrades are often constructed as if transit will represent an insignificant mode share. However, as government redevelopment agencies begin to recognize the potential to minimize congestion-related costs by investing in mass transportation systems, they are revising the parking and roadway upgrade formulas for new commercial developments. As the Municipal Research Service Center stated in a 1997 report to government development agencies, "a lower street level-of-service may be justifiable in urban areas that have compensating transit or other circulation options."[17] Considering the opportunity to increase net leaseable space by resizing parking areas and reducing parking construction and maintenance costs, selecting a site efficiently served by transportation is a clear opportunity for savings.

River Place in Portland, Oregon has always been a transportation-oriented development—20 years ago it was a freeway, today it's a 10-acre mixed-use development and home of the Pacific Gas Transmission office building. Programmed to provide workers and residents a range of amenities within walking distance, River Place includes a hotel, 480 residential units, restaurants, and retail shops. In addition to efficient and scenic pedestrian access on site, River Place has transit service to other Portland metro destinations. Due to an appropriate mix of businesses, scenic views, and transit access, office space and businesses are fully leased and hundreds of people visit the development daily. Combining high-density, mixed-use, transit oriented development, River Place is a key component of the City of Portland's plan for a pedestrian environment.[18]

Summarizing the Advantages of Urban Design Related Strategies

It is important to reiterate that there are financial reasons to site developments using environmentally efficient urban design strategies. Taking advantage of a nearby employee base and the rich variety of services dense, mixed-use areas offer, commercial properties can ride out economic shocks while deterring sprawl. By seeking sites served by public transportation and maximizing the use of in-place infrastructure, transit-oriented developments can benefit from reduced road and utility costs, minimized parking

requirements, flexible zoning, and lower impact fees.[19] By selecting high density, mixed-use sites efficiently served by transportation, developers can create valuable places that satisfy tenants' desires, reduce development and operating costs, and minimize negative land use impacts.

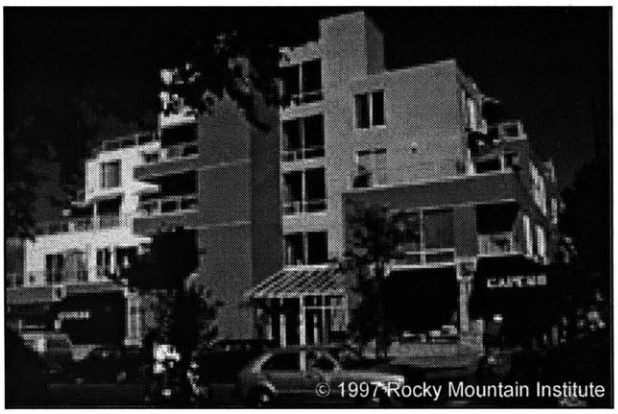
Urban, Redevelopment, and Infill Opportunities

Addressing tenants' preferences for office space in dense, mixed-use districts, there are currently immense opportunities to develop commercial buildings in urban, infill sites. Without even considering incentive programs designed to promote urban, redevelopment, and infill development, the financial benefits can be significant. Although some current CBD office developments are infill or redevelopment projects, many developers still prefer to site new projects on suburban or greenfield parcels because they *perceive* there are fewer obstacles to development on undisturbed land. Site evaluation traditionally considers the physical, financial, and political obstacles without fully realizing the unique opportunities and potential of infill development.

At the site level, infill development can reduce infrastructure costs and capitalize on pre-existing markets. Developers can avoid excessive conduit costs required to supply commercial sites with necessary utilities (water, gas, sewerage, telecommunications, etc).[20] Instead of extending infrastructure to new sites, the close proximity of pre-existing infrastructure to urban, infill, and redevelopment sites has the potential to reduce hard costs.[21]

A further advantage of urban, infill, or redevelopment projects is the potential to negotiate variances and approvals flexibility with local development officials.[22] While the complexity of urban infill or redevelopment projects is initially daunting due to code restrictions, potential community participation obstructions, site and staging constraints, and the risks associated with environmental mitigation and extended development timelines, governments are beginning to assist developers in making infill and redevelopment projects possible and profitable.[23] With the supply of urban infill sites exceeding demand projections in some cities, there is a "buyers market" for infill sites.[24] Reducing community participation complications and extended timeline risk, some development jurisdictions sponsor infill development projects and act as community liaisons for the project.[25] Relaxing excessive and often outdated code restrictions, such as minimum parking requirements and pre-existing lot size standards, development officials often approach infill and redevelopment projects from a more comprehensive perspective.[26] Through the use of performance-based building standards that emphasize outcomes congruent with the jurisdiction's development objectives, infill and redevelopment projects can benefit from flexible restrictions, variances, and

waivers.[27] Finally, attempting to limit unnecessary development delay, many governments, such as the City of Santa Barbara, California now offer a streamlined development review process for green, infill projects.[28]



An excellent example of a project that successfully integrates a variety of land use strategies is "2211 West Fourth," located in Vancouver, British Columbia. Developed in 1993 by Harold Kalke, 2211 West Fourth is a 138,00 square-foot, four-story mixed-use project in the Kitsilano district of Vancouver. By maximizing the use of the infrastructure that remained from the sites former use as a car dealership, Kalke was able to reduce development hard costs. Using the earth's heat to minimize energy consumption, 2211 West Fourth includes a geothermal heating system that uses heat from the earth and provides the commercial tenants with heating and cooling and also provides the residential units with hot water. In addition to saving on heating and cooling infrastructure costs, commercial tenants pay higher than market rent due to lower operating costs.[29] In 1996 Kalke estimated that 2211 West Fourth saved $850,000 in advertising and leasing fees due to free media coverage, achieved a $1.16 million residential net sales premium, and a commercial premium of four to six dollars per square foot due to location and building features. He estimates 2211 West Fourth saves approximately $60,000 annually on operating costs.[30]

Qualifying Urban Design Related Strategies

While many developers have experienced cost savings as a result of developing high density, mixed-use, urban infill sites served by transit, developers should be cautioned that anticipated savings can turn into development cost overruns if projects are not closely managed. First, the complexities of developing projects of considerable scale on urban and infill sites can be a deterrent for inexperienced, less sophisticated developers. Potential complications surrounding site remediation, financing, contracting, and construction (staging, access, schedule) can derail urban infill projects. Second, after assuming the real and perceived risks associated with urban infill sites, developers are sometimes not permitted to develop high density, mixed-use projects as-of-right. Despite zoning boards' desire to inhibit sprawling development, many continue to enforce low-density minimum units per acre, large minimum lot sizes, single use zoning, and excessive parking requirements. Often at odds with development authorities' stated objectives,

many urban areas continue to enforce zoning and codes that promote low density, automobile-oriented development. Finally, urban, mixed-use, high-density projects are subject to a political process that is potentially obstructive, often costly, and always interesting. While developers can often win the support of political and civic leaders, many municipal development guidelines include multiple town and community meetings for the public to air their concerns. To satisfy these concerns, developers are often required to construct community facilities, improve nearby streets and transit areas, provide community parking, or finance community programs. As one developer stated, "the development process has more to do with politics than it does with zoning. We could be presenting a very community-oriented project and still have to pay linkage depending on who shows up at the town meetings." The political climate surrounding high-density, urban infill projects is an impediment many developers opt not to confront.

Design Guidelines to Achieve Qualities of Place

Project complexities, zoning restrictions, and political hurdles aside, the financial advantages of environmentally efficient land use strategies are potentially substantial. In order to see urban infill projects through to fruition, it is important that developers are familiar with both urban infill development in general as well as the particulars of the area. By targeting development solely in urban areas, developers can maintain the professional and political ties necessary for limiting risks associated with local politics and the public review process. To limit risks associated with zoning restrictions, plan approvals, site remediation, and financing, developers should attempt to do as much site investigation and preliminary project meetings during the due diligence phase as time permits. Instead of using the due diligence period as a time to secure financing and take a few core samples, the few months before the purchase date is an opportunity to understand and evaluate site possibilities, potential risks, and eminent challenges. Finally, taking an integrative development approach can reduce project complexity by increasing communication between parties, involving diverse interests instead of fighting project opponents, and increase zoning and linkage flexibility.

Combining the implications of tenants' preferences and the capital and operating efficiencies explored in this chapter, the following are site level design guidelines that promote the efficient use of environmental resources and hedge negative outcomes while offering developers financial opportunities.

- **Site buildings in high-density areas.**
  Writing on the greening of cities, Jennifer Ross cautions developers to consider "the numbers of potential beneficiaries either living, travelling or working in the vicinity of the site - isolated and infrequently used areas that are not already a focus of activity have little prospect of becoming so and should therefore be given low priority."[31] Commercial developments should be sited in high-density areas to satisfy tenant demand and take advantage of existing real estate market demand in the area, a resident employee base, and proximity to business amenities.

- **Incorporate other uses adjacent to commercial uses.**
  A mixture of supporting stores and services adjacent to commercial developments uses areas more efficiently than single-use developments. Developers of mixed-use commercial properties can lower their income risk by diversifying their income streams across a mix of uses that operate at different times throughout the day. If the uses in the district or project are carefully selected, developers can benefit from efficiencies in the operating of mechanical systems and support facilities such as parking and conveyance systems.

- **Select sites served by mass transit.**
  Developing sites served by mass transit can have both financial and environmental implications. The environmental benefits of fewer daily automobile trips, and therefore fewer vehicle miles traveled, include reductions in fuel and energy consumption, automobile emissions, greenhouse gasses, and paved surfaces. From a development perspective, scaled-down on-site parking requirements free up land for income producing development and reduce maintenance and development costs associated with excessive parking facilities.

- **Approach redevelopment and infill projects as opportunities.**
  Infill and redevelopment projects maximize the use of in-place infrastructure and minimize development costs associated with trunklines. Trunklines include utility conduits, sewerage, and roads. The combination of the ability to reuse costly infrastructure and the insulative benefits of locating within a pre-existing urban environment make infill and redevelopment projects attractive prospects.

- **Use the due diligence process as an opportunity to minimize risk.**
  Developers can limit risks associated with zoning restrictions, plan approvals, site remediation, and financing, through site investigation and preliminary project meetings during the due diligence phase. Working with technical consultants, city officials, and financiers, developers have the opportunity to understand and evaluate site possibilities, potential risks, and eminent challenges to the project before they become committed.

Notes

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Chapter 4

Capitalizing on Current Incentives and Future Policy Directions

Regulations and public programs administered by development-related agencies promote and expand developers' opportunities for green development. While restrictive development codes and policies were a major hindrance to green projects in the 1970s, the current political climate has prompted a variety of government agencies to review and revise development zoning and codes. With a new emphasis on encouraging environmentally sensitive development, agencies who at one point discouraged green commercial projects through development regulations are now instituting performance-based, pro-environment development guidelines and are providing developers with a continuous stream of information about environmentally-related best practices. By taking advantage of rebates, special financing arrangements, and access to technical information, developers can more easily satisfy their environmental objectives in concert with their financial agendas.

There are a variety of programs offered by public utilities, government agencies, and private organizations that promote green development efforts. This chapter summarizes and categorizes voluntary programs available to commercial green developers. As with any topic directly influenced by public sentiment, programs favoring commercial green development continue to evolve and undergo change as a result of political agendas.

While all incentive programs are voluntary by definition, there is no guarantee that environmentally sensitive development practices will not be mandatory in the future. Developers can take advantage of the green development incentives now instead of making costly changes to commercial buildings after building codes and environmental standards become more stringent. Considering the current development trends identified in this chapter, voluntarily developing green commercial buildings is less expensive now than compliance will be in the future.

Current Programs

Government agencies such as the Environmental Protection Agency and the Department of Energy are currently the primary sources of green development programs and incentives at the federal level. Often less visible, several regional and local utility providers offer programs that promote energy savings and other green development practices through the use of technologically advanced building systems and integrated development

approaches. Programs and policies supporting commercial green development efforts can be traunched into three primary categories: financial incentive programs, technical assistance programs, and hybrid programs—programs combining both technical and financial assistance. Regardless of the program type, scale, or sponsoring agency, all incentives and programs are currently voluntary.

Financial Incentive Programs

The first and most favored type of program provides developers and building owners with financial incentives (e.g. energy rebates, capital expenditure rebates, favorable tax treatment) to adopt environmentally sensitive building systems. Financial Incentive programs are offered at the federal, state, and local levels, and most require some form of independent building certification and monitoring.

At a federal level, the Taxpayer Relief Act of 1997 is an example of a financial incentive program. The first Federal law in over a decade to provide tax incentives for land conservation, the act allows owners and developers of land in recognized metropolitan areas, wilderness areas, urban national forests, or national parks to receive favorable tax treatment.[1] In order to receive tax credits, owners must agree to donate a perpetual conservation easement for the purposes of protecting historically important buildings or land, natural habitats, or open space. The degree of the tax reduction depends upon on several conditions, most of which are related to the condition of the conservancy land, the restrictions placed upon the land by the landowner, and the appraised value of the land at the time of donation. The value of a conservation easement is calculated by subtracting the value of the land under development restrictions from the unrestricted, market value of the land. The direct annual benefits to taxpayers include a federal income tax deduction equaling the amount of the easement as well as reduced estate taxes.[2]

An example of a state-level financial incentive program is the Oregon Business Energy Tax Credits program. The program provides a tax rebate to commercial building owners that employ energy efficient measures (EEMs). As the administrators of the annual rebate program, the State of Oregon Department of Energy evaluates the extent to which building design and building systems effectively reduce energy consumption as a means of determining tax rebates. Building owners who satisfy all design and performance criteria are eligible for up to a 30 percent tax credit.[3]

Most financial incentives, however, are offered by electric utility companies in the form of energy rebates, and to a lesser extent lighting and HVAC subsidization. In the midst of electric utility deregulation as mandated by the

Energy Policy Act of 1992, many utilities offer developers and building owners rebates on their annual electricity bills in exchange for implementing energy reducing features.[4] In 1996, 196 US electric utility companies offered rebates to energy-conscious commercial customers.[5] As utility companies are deregulated and must compete for customers, many companies now subsidize electrical and lighting upgrades in addition to standard electricity rebates.

One of the most publicized projects receiving energy rebates is the Audubon House in New York City. While renovating an 1890s office building on the corner of Greenwich Village to be their national headquarters, the National Audubon Society design team worked in with ConEdison, the local energy provider, to introduce energy efficient measures within the existing building. In addition to using 68% less electricity and 61% less energy than it did prior to renovation (an estimated savings of $100,000 annually), the building received $110,175 in capital rebates from the utility company for installing energy efficient HVAC and lighting systems. The rebate assistance from ConEdison reduced a five-year payback period on the green improvements to only three years.[6]

Despite their attractive monetary benefits, financial incentive programs have their problems. Due to the bureaucratic nature of sponsoring agencies, financial incentive programs often involve complex eligibility requirements and are too specialized to inspire widespread adoption. Furthermore, unless incentive programs have a secure source of funding, such as the earmarking of user service fees to finance utility rebates by energy companies, program funding can be very limited and subject to budgetary constraints—especially at the local and regional levels. In addition, with the exception of a few DOE programs, most financial incentive programs only promote the use of 'tried and true' green technologies such as high performance lighting and HVAC systems.[7] By limiting owners and developers to improved traditional technologies, incentive programs discourage the development of emerging technologies. Finally, from a broader perspective, financial incentive programs often reward incremental technological changes over integrated development approaches. For example, because a building's orientation, enclosure system, HVAC, and lighting systems are dynamically related to energy savings, focusing energy saving efforts on one or two individual systems may not optimize energy savings.

Technical Assistance Programs

The second type of program, and at this point the most widely available, supplies commercial developers with free technical assistance. Technical assistance may include specifications, design, energy consumption, product selection, system modeling, and development consulting. While these

programs do not directly provide developers and owners with income, they assist the development team in engineering aspects of the project and thus improve building quality, energy efficiency, and value.

At the federal level, the most recognized and successful technical assistance programs are the Green Lights® and Energy Star Buildings℠ partnerships sponsored by the US Environmental Protection Agency (US EPA). Energy Star Buildings℠ is a voluntary program that promotes energy efficiency in commercial and industrial buildings. Developers and organizations must follow a five-step plan prescribed by US EPA technicians to reduce total energy consumption. The plan aims to be both cost-effective to implement and cost-saving over extended building system lifecycles. Media publicity and technical and financial information are tailored to support commercial building owners and managers.[8] The Green Lights® program is the first step in the Energy Star Buildings℠ program, a program that encourages widespread use of energy efficient lighting. As of January 1999, there were 3,000 organizations participating in the Energy Star Buildings℠ and Green Lights® partnerships and this number continues to grow.[9] The US EPA estimates the programs have prevented 35.5 billion pounds of carbon dioxide from entering the atmosphere and the participants are cumulatively saving $593 million in annual energy costs. On average, participation resulted in 15% energy savings with internal rates of return on energy efficient system investments reaching as high as 51 percent.[10]

More prevalent than any other program category, state and local technical assistance programs are widely available. Although many technical assistance programs offered by utility companies and local and state governments are the result of US Department of Energy pass-through funds, the success of government funded programs have spurred substantial non-profit and private organizations to offer environmentally sensitive development resources and services, sometimes at a cost to the developer or owner. Several organizations such as the Green Building Resource Center, E Source, OIKOS Green Building Source, the US Green Building Council, the US National Park Service, and the American Institute of Architects maintain searchable databases on topics ranging from green development technical assistance programs and energy efficiency information to green construction material sources and consultants.

At the state and local levels, technical assistance programs offer commercial building owners and developers a variety of services. Services range from selecting environmentally sensitive building materials to recommending low- and no-cost energy efficient improvements. For example, the California Integrated Waste Management Board administers CALMAX, a program that reduces hard costs by educating contractors about construction site waste recycling.[11] At the local level, the City of Austin Commercial Green Builder program assists developers and owners with selecting energy and water

efficiency measures, waste management strategies, and environmentally friendly building materials and products.[12] While the majority of program services are geared toward aiding the design team during the pre-design and schematic design phases, the program continues post-occupancy to ensure appropriate system operation and that owners are realizing target energy efficient savings.[13]

Hybrid Programs

Broadly defined, hybrid programs combine any number of financial incentive qualities and technical assistance characteristics across a variety of regulatory and agency levels. Arguably the most effective and attractive of current programs, hybrid programs provide developers and owners with both the financial rationale and technical expertise to best integrate green development technologies. The real power behind hybrid programs is the extent to which they align developers' and owners' short-term, personal interests with broader societal goals and objectives. By offering developers and owners both the financial incentive and the information required to adopt an integrated, financially successful green development strategy, hybrid programs are the best conduits for change—change that extends beyond piecemeal employment of technology and toward the mainstreaming of green development.

Jointly administered by the US EPA and the US DOE, the Climate Wise program is an example of a hybrid program that provides developers and owners with financial incentives and technical assistance. Climate Wise is a government-industry partnership that allows participating businesses to receive 40 hours of free consultation each year in developing and evaluating plans to decrease greenhouse gas emissions, increase energy efficiency, and enhance indoor air quality. The program is voluntary, and does not directly provide financial incentives to developers outside of in-kind information and planning assistance. However, because the program has a growing constituency and is recognized as being technically effective and environmentally sound, benefits of the Climate Wise partnership extend beyond the formal, federal program. For example, cooperating with the Small Business Administration of Colorado, many state lending institutions guarantee private sector loans for Climate Wise projects. In Dade County, Florida, Climate Wise partners benefit from regulatory flexibility and low-interest loans.[14] Participating Climate Wise developers and owners save on energy costs, benefit from more productive tenants as a result of better indoor air quality and lighting, receive technical assistance and integrative system planning, and qualify for valuable development and credit flexibility. Environmentally, the program reduces energy consumption and greenhouse gas emissions. There are currently over 300 Climate Wise partners.

One of the earliest examples of a hybrid program offered by a utility company is Portland General Electric's (PGE) Earth Smart program. PGE Staff work with the developer, design team, and owner to select environmentally sensitive building systems, generate financial projections as a result of the energy efficient equipment upgrades, and identify financial incentives for energy-saving capital investments.[15] As a requirement for program certification, developers and owners are required to participate in a design process addressing energy efficiency, indoor air quality, environmental responsibility, and resource efficiency measures. To ensure that building systems are appropriately calibrated and operating at optimal efficiency, building owners must provide commissioning services.[16] Norm Thompson Headquarters, the first commercial building to be certified under this program, qualified for a 25 percent utility rebate from PGE in 1995.[17] For a typical 100,000 square foot commercial building, a 25 percent rebate translates into average savings of $45,000 per year.[18] The Earth Smart program has experienced rapid growth over the last year, as commercial building owners and developers realize the value of energy saving assistance.[19]

Finally, at an international scale, the International Performance Measure and Verification Protocol (IPMVP) provides developers with both consulting services and quantifiable, lender-trusted energy conservation monitoring. Beginning in 1996 as the North American Measurement and Verification Protocol, the program was expanded in 1997 to encourage international participation.[20] While there is a participation fee, building owners, contractors, developers and financiers recognize the IPMVP as a basis by which to forecast and maintain energy savings. Tailored specifically to assist developers and owners in financing energy efficient capital investments, the IPMVP program helps owners and developers optimally design, operate, and maintain energy related building systems.[21]

Figure 4.1

Example Green Development Incentive Programs

	Financial Incentives	Technical Assistance	Hybrid Programs
Federal Programs	The Taxpayer Relief Act of 1997	US EPA EnergyStar Buildings Program	Int'l Performance Measure & Verification Protocol
State Programs	Oregon Business Energy Tax Program	CALMAX Program	Climate Wise Program
Local Programs	ConEdison Utility Rebate Program	Austin Commercial Green Builder Program	PGE's EarthSmart Program

Green Development Incentive Programs: Summary and Critique

The decision to develop in an environmentally sensitive way should not depend on support from incentive programs. Experienced green developers seem to know this, as only a small percentage of green projects take advantage of incentive programs.[22] Even as programs are becoming more visible and popular, the use of incentive programs as a development cost saving strategy is cautioned.[23]

In discussing his mixed-use green project at 2211 West Fourth Avenue in Vancouver, B.C., Harold Kalke summarizes his difficulty with obtaining utility rebates from B.C. Hydro:

> "Although the local public utility, B.C. Hydro, publicly states that it will provide rebates on high efficiency lighting as well as the earth loop heat pumps, it is very difficult if not impossible to actually 'get the cheque.' In our project we did not receive any rebates for the installed earth-loop system; B.C. Hydro pulled some rather stupid conditions out of the hat at the last minute."[24]

There are often a complicated and unclear series of requirements that must be satisfied in order to receive financial incentives such as energy and capital expenditure rebates. Furthermore, while many rebate programs are truly committed to offering utility rebates, funding is often limited and a few large, high-profile projects succeed in fully depleting the programs annual budget. Smaller projects, especially retrofit projects located in non-urban areas, cannot compete with larger urban projects for energy efficient system rebates. As illustrated by Kalke's comments, programs that offer direct financial incentives are attractive but often difficult to obtain.

Hybrid programs appear to maximize value-adding project features and are the most attractive from the perspective of promoting the mainstreaming of green development. In contrast to financial incentive programs that often reward incremental technological changes, hybrid programs typically favor an integrated development approach over piecemeal system-by-system engineering. As most hybrid programs require performance monitoring, owners and developers must actively and effectively participate in complying with building emission and environmental benchmarks in order to receive building certification.

Hybrid programs do have their downfalls, however. First, because the technical and financial incentives that make up hybrid programs are often provided by two separate but related programs, the continuous link between the programs is somewhat tenuous and building owners' ability to receive ongoing services post occupancy may be limited. Second, hybrid programs,

especially when financial and technical services are provided by two different agencies, are often less visible than other incentive programs. Hybrid programs exist at a variety of levels but are not often publicized as providing both technical and financial services. Third, hybrid programs are subject to the same budgetary funding constraints as financial programs. Fourth, compared with the widespread and growing availability of national, state, and local technical assistance programs, hybrid programs are relatively scarce. Finally, and this point may be the most significant deterrent for developers, there is often a fee associated with different packages of hybrid services. While research did not explicitly identify program fees as a reason not to participate in hybrid programs, it may be difficult to convince traditional developers to pay for services that they *perceive* may introduce more initial costs and operating risks.

Technical assistance programs are the best opportunities for development savings. First, while there are no direct financial incentives as a result of participation, technical assistance program services can reduce capital costs and create perpetual energy savings—eclipsing the value of one-time capital rebates. Second, the availability of technical assistance programs is astounding relative to financial and hybrid programs. Technical programs exist at a variety of levels, and most programs are available to even the smallest of commercial projects. Third, unlike veiled requirements associated with programs offering financial incentives, participating in technical assistance programs is relatively straight forward and programs are often committed to post occupancy monitoring to ensure performance standards are being met. Finally, most technical assistance programs are free to developers. If services require a fee, fees are insignificant relative to savings and are sometimes based on post-occupancy performance.

The Future of Green Development Programs

While future environmentally sensitive development policies are uncertain, policy initiatives related to commercial green development continue to surface. This section presents the current trends in development research and policy recommendations as a basis to consider how future development-related policy might change. Analyzing the recommendations of public and private agencies concerned with development policy, the remainder of this chapter focuses on current trends in development policy and how adopting a green development approach now may avoid costs in the future.

National Development Policy

If current development policy recommendations are any indicator of the future programs and services promoting green development, industry movement toward commercial green development is in its early stages. As environmental issues become increasingly salient, a growing public awareness will continue to create programs that promote and reward green development initiatives. One way to understand the future directions of green development is to track the research and recommendations of national, industry-respected, private organizations such as the Urban Land Institute (ULI), the Brookings Institution, the Lincoln Institute of Land Policy, and the Rocky Mountain Institute (RMI). Representing major real estate development interests and conducting development research, they serve as powerful information providers to the government and act as barometers of industry change. The US Department of Energy (US DOE), the US Environmental Protection Agency (US EPA), and the President's Council on Sustainable Development (PCSD) are the primary government agencies at the federal level concerned with green development policy. As many of the current state and local green development policies mirror national programs and policies, this discussion is limited to development research and policy trends at the national level.

In reviewing the current research foci and policy recommendations made by both public and private national agencies, the promotion of green building characteristics and the facilitation of urban and infill redevelopment are two areas of development policy with significant momentum. Aimed at improving indoor health conditions and inhibiting sprawl, the implications of such policy, if enacted, may have concrete impacts for commercial developers.

Policy responses to urban and suburban sprawl underlie most of the current development policy research and recommendations. Within the broad category of "sprawl reform," the promotion of urban infill and redevelopment is a major trend. As the most articulate federal agency in support of facilitating urban and infill redevelopment, PCSD's 1999 Draft Report to the President recommends new policy and programs designed to make urban and infill redevelopment projects more attractive to developers.[25] Promoting urban infill development by allowing commercial property owners to take advantage of location efficient mortgages (LEMs) and creating individual development accounts (IDAs) for smaller, local developers, the PCSD recommends creating more "market mechanisms" to reduce the financial risks associated with infill development.[26]

In further support of urban infill and redevelopment projects, other real estate related research agencies are focusing on issues surrounding to urban infill, redevelopment, and increased density. Recognizing the strength of the environmental and economic argument for urban infill and redevelopment

projects, the Urban Land Institute is veering away from research on conventional large lot developments and is now advocating for urban developments of increased density.[27] Similarly, in their publications related to sustainable development, infill, and transportation, RMI, the Brookings Institution, and the Lincoln Institute of Land Policy support infill, redevelopment and increasing urban density as sprawl reform mechanisms.[28]

The second trend in development policy is the promotion of environmentally sensitive building design, systems, materials, and processes. Focusing on issues such as building emissions, inefficient energy consumption, indoor air quality, and building related illness, the US DOE, US EPA, and the PCSD are using a health-centered argument to push for increased environmental sensitivity in the development industry. Promoting commercial green development practices through four primary methods, the PCSD advocates building retrofits to increase energy efficiency, design and construction techniques that reduce development and operational emissions, improving the energy efficiency of building systems and materials, and integrating new green building systems. Proposed actions include providing tax incentives or credits for the installation of green technology, improving existing energy programs such as the US EPA's Energy Star® program, promoting building technology partnerships and information sharing, strengthening "green" government procurement policy to promote technology development and fortify an emerging market for green building technologies, and increasing access to capital for green development projects.[29]

More aggressive than government agencies in supporting green development policy, private research and professional agencies strongly support the mainstreaming of green design, systems, materials, and processes.[30] While the list of proposed development policies related to green development is too long to list here, suffice it to say that there are hundreds of private agencies that support more stringent environmentally sensitive development policies.[31] The Rocky Mountain Institute, the American Institute of Architects, the US Green Building Council, and many others have proposed and support policies related to promoting the mainstreaming of green development products and services.[32]

From a real estate perspective, the environmental and health-based issues these recommendations are designed to address will have direct impacts on the commercial development industry. In response to land use sprawl, concerns about transportation emissions, infrastructure waste, and economic vitality are at the root of urban infill and redevelopment related policies.[33] Similarly, green development policy recommendations are designed to reduce greenhouse gas emissions associated with the creation and operation of buildings, minimize commercial building energy waste, and improve the indoor environmental qualities of buildings to promote occupant health and productivity.[34] Considering the environmental concerns upon which current

recommendations are proposed and the momentum behind these proposals, trends in national development policy suggest a dramatic, environmental departure from traditional policies. If current trends manifest into future realities, the development industry, particularly the commercial sector, will refocus on development within cities and create buildings that impose less burden on the natural environment, are safer for occupants, and are worth more than traditional commercial assets.[35]

Developers of conventional commercial buildings should take note: policy targeted to revitalize urban areas and produce environmentally sensitive buildings will have several potentially severe impacts on commercial developers. First, programs that are now voluntary will become mandatory. Instead of taking advantage of green building incentive programs that currently subsidize system and consulting costs, developers will be required to implement environmentally sensitive strategies at their own expense. Second, in the short-term, retrofits of conventional commercial buildings will be necessary to maintain market appeal. Tenants are becoming increasingly aware of the health and productivity benefits of green commercial buildings. Third, in the longer-term, building codes will be revised and updated to address the human health concerns often found in conventional commercial buildings. With impacts on numerous building systems, compliance with updated building codes could be costly enough, especially when buildings are situated in lower demand non-urban areas, to render commercial buildings obsolete. Finally, a resurgence of urban commercial development will reduce the demand for isolated, automobile-dependent suburban office parks. An onslaught of financial incentives will generate interest and create opportunities for urban infill and redevelopment, and urban centers of moderate density will emerge as the premier market for firm location. While the above are only predictions of future conditions, if even a fraction of current recommendations become development policy, the value of incentive programs that facilitate urban infill and green development initiatives is large. Considering the costs associated with pending changes in development policy, it is not financially rational to continue to blindly develop conventional office buildings.

Government Procurement Policies

In cases ranging from the Portland Public Facilities building to the redevelopment plan for the Presidio in San Francisco, evidence supports that government trends favoring an internal green procurement policy may extend to the development and retrofitting of government real estate nationwide. If widely instituted, the extension of a green development procurement policy has several benefits.[36]

First, and most obvious, the same financial advantages for private investment in green development apply to governments. Ranging from increases in worker productivity to energy cost-savings, the government, as the owner of a vast real estate portfolio, can financially benefit from adopting an environmentally responsible policy for real estate acquisitions and development.[37] For example, realizing that energy cost savings go directly to the bottom line, the US Department of Energy mandates procurement policies that improve energy efficiency and require that all public buildings meet lighting efficiency standards.[38] Similarly, the City of New York has proposed to retrofit many of the existing buildings in its portfolio to take advantage of the productivity gains, operating savings, and the reduced lifecycle costs associated with green strategies (see chapter two).[39]

Second, internal government procurement policies that favor green development may act as innovative catalysts, leading to technological advances in environmentally efficient building systems. Under this scenario, such a procurement policy would advance the use of green development techniques as a minimum standard for institutional developments and create growing markets for environmentally sensitive building materials, technologies, and systems. Considering that approximately 150,000 federal buildings are scheduled for demolition over the next decade, the impact of a green government procurement policy will have major impacts on system development and a growing green development service sector.[40]

A good example of government agencies requiring the use of environmentally sensitive development strategies and systems is the Naval Facilities Engineering Command Sustainable Development Program. A program that began in 1998 by the US Navy, the Sustainable Development Program requires all new developments and facilities related purchases to exceed minimum environmental benchmarks, "regardless of geographical location, cost, funding source, procurement method, or customer."[41] Congruent with these guidelines, the redevelopment of the old Presidio Army base in San Francisco, CA required bidders to submit a detailed sustainable development program that outlined environmental building and planning features including the use of sustainable materials, construction methods, waste management, water conservation, transportation alternatives.[42] On 14 June 1999, LucasFilm, Ltd. was awarded the redevelopment rights to the Letterman Hospital on the Presidio based on their environmentally sensitive mixed-use campus design.[43] Green guidelines constituted one-third of the redevelopment selection criteria.[44]

Finally, adopting a green real estate procurement policy could be construed as a form of government signaling.[45] A green procurement policy would position the government as a leader in the green development arena, promoting a "learning by doing" approach to propelling the evolution of building related industries.[46] More importantly, an investment policy that

explicitly favors green development would serve as a social and economic indicator of the future of real estate development. Considering the growing number of environmentally sensitive government procurement programs, it is possible that government agencies will, at some point in the near future, extend their internal development regulations to the private real estate industry.

Hedging the Policy Pipeline: Avoiding Retrofits and Building Obsolescence

Considering significant changes in land use policies, building codes, and building system requirements over the lifecycle of existing buildings, there are indications that in the future the public will require buildings to be increasingly environmentally friendly. In 1990, Congress mandated the retrofit of commercial real estate to satisfy the Americans with Disabilities Act (ADA) at great expense to building owners.[47] Why then, in a political climate that is seemingly environmentally sensitive, would policy makers not respond to the environmental health threats that many conventional office buildings pose?

Green commercial properties have the potential to avoid three retrofit and obsolescence risks common to conventional office buildings. Changes in building regulations at any government level can have a direct, negative financial impact on the building owner. Forced into compliance by law, building owners may or may not receive financial assistance for the capital expenditures potentially required to update building systems. Using poor indoor air quality (IAQ) as a hypothetical impetus for policy change, new requirements could mandate that buildings maintain a high percentage of fresh air intake and low levels of volatile organic compounds (VOC) and other pollutants thought to be related to Building Related Illness (BRI)—benchmarks that would require many conventional office buildings to undergo major system and material changes to attain compliance. Due to the potential requirement uncertainties and the idiosyncratic air quality differences across traditional commercial buildings, it is difficult to assign a value to avoiding this risk. However, considering that poor IAQ is often traced to a variety of building systems, from the HVAC system to carpeting and finish materials, all of which may need to be upgraded or replaced, compliance costs could be devistating.

The second risk, which may precede changes in building codes and development policy, is a change in the demand for traditional commercial space. Tenants' satisfaction with building system technology and the design of space may reduce demand, driving down rents, or in extreme cases, lead to building obsolescence. As the Real Estate Research Corporation stated in a 1996 report:

> "Obsolescence (is) ravaging not only older properties but poorly conceived buildings of recent vintage as well. Building longevity will be dictated largely by how properties accommodate the now-unknown systems and technologies that future tenants will require." [48]

Developers and office building owners now have the capability to understand what tenants currently value and can track changes in these values to understand tenants' demands in the future. In 1999 the Urban Land Institute (ULI) and the Building Owners and Managers Association (BOMA) International surveyed 1,829 office tenants in 126 metropolitan areas about the desirability of office features, amenities, and services. Ninety-nine percent of the tenants ranked indoor air quality, temperature control, and acoustics/noise control as "very important" or "important." Similarly, ninety percent of the tenants considered "environmentally friendly building systems and materials" equally important.[49] While surveying office tenants' desires doesn't necessarily equal their willingness to pay, it does mark tenants' surprisingly strong awareness of the quality of their indoor environment—an awareness that could eventually translate into a shift in demand. If policy is created to reflect the demands of its abiders, growing tenant demands and BRI concerns could force a mandatory transition toward green commercial buildings in the near future.

Liability is the third risk green commercial building developers and owners can partially avoid. With increasing frequency, owners, developers, and contractors of conventional commercial buildings are finding themselves in lawsuits brought about by governments and private individuals over health-related complaints. In a 1995 case between Polk County, Florida and the insurance company of the project builders, the county was awarded nearly $26 million to correct design and construction flaws that promoted HVAC system mold growth and pay for occupant illnesses. Another case in Illinois found the owner of a building responsible for health-related illnesses due to improper operations and maintenance. While it is unlikely that all owners, developers, and managers of conventional office buildings will find themselves in court due to indoor environmental health problems, these costly, high-profile judgements may result in decreases in productivity, increases in workers' compensation claims, higher professional liability insurance premiums, and building codes and specifications aimed at safeguarding building users.[50]

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Chapter 5

Integrative Development Processes Maximize Project Savings

This chapter focuses on how the development process, the way in which projects are planned and built, can lead to development savings. This chapter begins to explore *how* to implement the commercial green development strategies discussed in previous chapters. In planning and constructing environmentally sensitive projects, developers include a range of stakeholders to address issues ranging from indoor environmental quality to site access. In order to design green buildings as a combination of interconnected systems, green development projects must be inclusive—they must methodically incorporate diverse parties in the development process. While astute developers understand the civic importance and the "good practice" financial realities of an inclusive development process, green projects require broad input during the initial stages of project planning in order to minimize change orders and maximize the value of whole systems engineering.

Fostering an open yet focused development environment can improve the financial success of development projects. Savings come from shorter development timelines, fewer change orders, and reduced capital costs. Creating a project vision early in the process and aligning interests allow developers to benefit from the impact of incorporating a variety of skills and perspectives, early in the process, to reach consensus on the design and the performance of the finished project. Working from an agreed upon direction for the building, the development team can make up-front decisions that save time and reduce change orders. Additionally, by programming the building as an integrated whole, building systems can be designed to maximize performance and minimize capital and lifecycle costs.

The integrative development process has the greatest potential for cost savings. Perhaps the most significant finding of this thesis, an integrative development process reduces community and governmental friction, aligns project interests, and most importantly, creates a forum in which building systems can be collaboratively integrated and cost savings can be optimized. More than just another component strategy developers can employ to potentially save development and operating costs, the integrative development process is the mechanism through which design, siting, and incentive program costs savings are optimized. The integrative development process has the potential to create total development savings that exceed the sum of individual savings by approaching commercial projects as an interconnected combination of systems.

This section explores process-related development practices and savings and concludes with examples of how gearing the development process to include various stakeholders has added to the financial success of projects in Chicago, Illinois; Tucson, Arizona; and Denver, Colorado.

Creating Shared Vision

On a par with sound financial fundamentals, a guiding sense of a building's characteristics, or vision, is often the initial platform from which sustainable development projects launch. In order to maximize value creation through the employment of sustainable technologies and processes, green developments must be approached differently from traditional developments. The creation of a project "vision" is the first departure from traditional development. The project vision evolves from an understanding of place, spatial context, building use, and post-occupancy building performance goals.[1] The project vision defines energy conservation strategies, financial benchmarks, building levels-of-service, and functional and aesthetic targets for the project.

It is important to develop a project vision early in the predevelopment stage, prior to project planning and design. Using the vision as a statement to support and enforce sustainable goals throughout the development timeline, the principles set forth must provide comprehensive project goals from which incremental development decisions can be made.[2] As the key feature of integrated or whole-systems development approaches, the vision statement acts as the litmus test for on-going development decisions.

Importance of Aligning Interests

The adoption of tailored sustainable development goals is a salient characteristic of most successful green development projects. Which parties create the vision, however—developer, government, tenant, or citizens—may vary. Project success is not determined by who creates the vision, but rather by whom is vested in seeing the vision executed. Contrary to the outdated norms of the conventional top-down development process, developers should ensure stakeholders "buy-in" to the project vision, as it may facilitate project control, expedite the development process, and result in the creation of an asset that is more financially successful.[3]

Shifting from the traditional paternalistic development approach to one that is more consultative and inclusive, developers can often avert impediments in the beginning of the development process. While it is important to maintain control, introducing parties with a stake in the development in the early stages of planning and design serves to align the interests of tenants, local officials,

citizens, and the developer—thereby minimizing conflicts from the beginning. As many industry practitioners and scholars note, future project and development management processes will undergo a shift toward a more inclusive management style as it reduces inter-organizational and project friction.[4] The design-build model is one example of an inclusive development approach.

Vision can also be used to maintain project governance. Approaching development as a shared and participatory process, developers can effectively expedite development by addressing potential project obstructions before they arise. By involving a variety of stakeholders in creating a common understanding about development parameters, a shared vision can be used to align individuals' development concerns with the project vision.[5] In effect, revisiting the project vision can redirect the self-serving citizen and agency issues that often present roadblocks to project completion.

Aligning stakeholder interests through the creation of a shared vision can result in an asset that is potentially more financially successful than traditionally developed properties for several reasons. First, hard costs can often be reduced by applying an overarching set of sustainable development objectives to the selection of building and energy systems, spatial design, access requirements, and materials choices. Second, by including local development authorities in project planning and thereby expediting the approvals process, time savings equate to construction loan interest savings, development insurance savings, property tax savings, time-sensitive soft cost savings, and minimize the exposure risks (market, season) often faced by commercial developers.[6] A third and further savings opportunity comes in the way of reduced operating expenses. By identifying the interconnections across building systems, mechanical systems can be downsized—reducing loads and energy consumption. Finally, owners can increase life-cycle duration by using the project vision to program building systems to work together as an integrated whole. Despite conventional development lore, by implementing a shared vision approach early in the development process, commercial green developments often cost less than their traditionally developed counterparts over the life of the asset.[7]

Participation Problems: Structure and Size

Commercial development, as a result of its political, financial, social, and environmental dimensions, is fraught with problems—challenges. The green development process is subject to some of the same problems as more opaque conventional processes. As can be expected, many of the problems surrounding a participatory development approach surface as a result of whose input is included and how decisions with financial implications are made.

The development team is a venue in which goals and problems are addressed. By changing the linear, financially driven conversation common to conventional large-scale developments into a more dynamic discussion that combines financial analysis with building performance standards, participants can maximize value creation and minimize development inefficiencies and energy waste through an integrated approach. In general terms, a commercial green development team should consist of the developer, the project manager, the prospective tenants, project financiers, architects and engineers, relevant zoning and land use authorities, and select citizen representatives.[8] While this could be a large team depending upon project complexities, all parties are not engaged at the same time.

Regardless of who is on the development team, there are inevitably uncooperative parties. Whether these opponents fear change or feel they are being excluded, someone is always dissatisfied. In forming the development team, depending upon the circumstances, the team should expand to understand the opinions of project opponents as well as those of project advocates. By directly addressing the parties interested in stopping the creation of commercial green buildings, the team has the opportunity to inform, educate, and persuade potentially obstructive views.

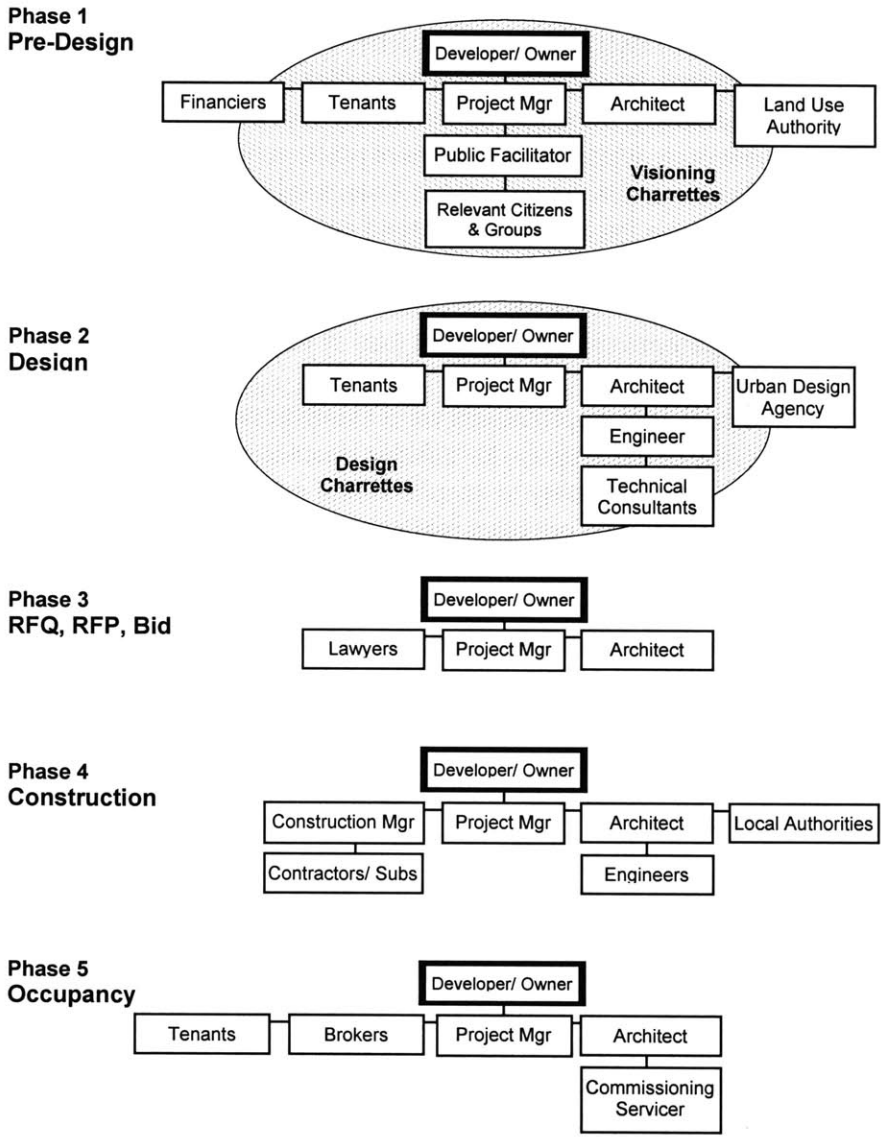
In addition to project opponents, there are obvious problems with creating development teams that are too large or too inclusive. First, decision making gets increasingly burdensome as teams grow large. Second, despite good intentions to create a collaborative atmosphere, some decisions must be made by a limited number of parties who have specific training, are taking financial risks, or have absolute responsibility. Third, inviting all interested parties to directly participate in the process is unrealistic. As even the most open-minded green developer will confirm, there is simply not enough time to devote to an all-inclusive development process. Finally, some parties and individuals, despite their inclusion in the project, will fail to constructively participate and attempt to derail the project.

One way to address many of the above problems is to create a development framework that allows the development team to expand and contract depending upon the project phase (see figure 5.1). Thinking about the importance of participation with respect to the project timeline, the project team should be at its largest size during the pre-design phase, during the formation of a shared, comprehensive project vision. Although it is important to keep the development team focused throughout this period of interest alignment, a diversity of perspectives can be efficiently brought to the team through visioning charrettes. Entering the design phase, the cast of peripheral stakeholders reduces and new, technical consultants are introduced to the team. By introducing consultants at this stage, the team may begin to select integrated building systems that are congruent with the

vision and thereby avoiding more difficult system decisions later in the process. In the bid phase, the development team shrinks even further, as the architect, project manager, developer/owners and lawyers are the only active parties. Finally, in the construction and occupancy phases, the development team expands to include tenants and construction managers and reintroduces local authorities to the team.

Figure 5.1 Changes in the Development Team over Time

(Author's adaptation of information presented in *Sustainable Building Technical Manual*, 1996.)



In an integrative development process, the developer acts as the facilitator of a roundtable venue. Collaboration is key to the success of an integrated green commercial building. Some team members, despite attempts to educate or "sell" them on the green development concept, will resist change and will have to be replaced. To exert some control over other members of the development team, specifically the architects and engineers, developers can align the interests by offering financial incentives congruent with the project vision (see page 24). Regardless of the situations that arise, the developer must embody the vision, remain astute and informed, and maintain relationships with all parties throughout the process.

An alternative way to gauge the potential problems encumbered by employing an inclusive green development strategy is to weigh them against problems common to the conventional development process. As Celia Taylor writes in *Sustainable Development and Good Governance* (1995), projects that lack an effective outlet for participation "may be conceived and designed improperly, impeding or prohibiting their implementation."[9] Taken to an extreme, a closed development process not only discourages community investment in the project but it can lead to a chain of development obstacles that have the potential to extend project timelines and deplete project budgets. A further complication, expanded development timelines can expose market driven projects to pipeline risk incommensurate with predetermined development fees or targeted financial returns.

If participatory processes were standard practice in the real estate industry, many of the reasons for building obsolescence (tenants' space and flexibility needs, the inability to accommodate new technology, building related illnesses) may not have rendered so many buildings unusable or undesirable in the early 1990s.[10] Considering the range of potential problems associated with conventional, exclusionary top-down processes, an inclusive development approach has the potential to create superior assets at lower prices.

Productivity: Further Support for an Integrative Development Process

As noted by the jury of the 1997 *Architectural Record / Business Week* Architectural Awards, tenant inclusion in the design process is key to creating a more productive workplace.[11] For both developers and tenants, the importance of approaching building design as an inclusive process cannot be overstated. In a survey of over 5000 public and private professional/technical and clerical workers administered by the Buffalo Organization for Social and Technical Innovation (BOSTI), worker satisfaction was strongly correlated to their participation in the office design and the selection of finish materials.[12]

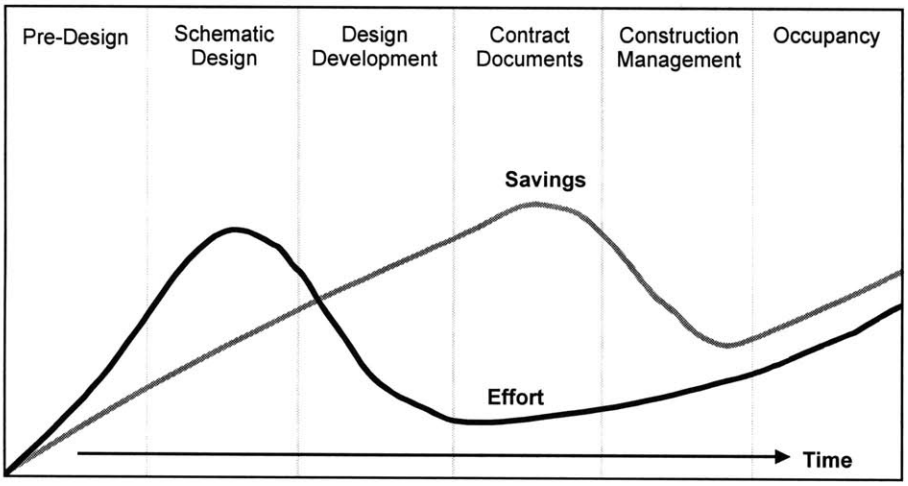
By including employees in the design and development process, developers can help clients ensure spatial comfort and select appropriate air quality systems. While an inclusion development process may appear daunting, developers and tenants adopting this approach found higher levels of employee satisfaction, workplace retention, and an interest on the part of the participating employees to assume responsibility and offer suggestions as to how to improve their environment. From an owners' perspective, employee satisfaction, and therefore tenant satisfaction, directly impacts tenant turnover and related transaction costs.

Using Process to Optimize Project Outcomes

There is more to maximizing the value of an integrative development process than merely involving a variety of stakeholders. In addition to who to include and how to include them, further research indicates that perhaps the more important question is *when* to include all the varying consultants, designers, development officials, and citizens. The answer is simple: the earlier the better.

Figure 5.2 Energy Savings versus A/E Effort over Time

(Shaw, Energy Design for Architects, 1989.)

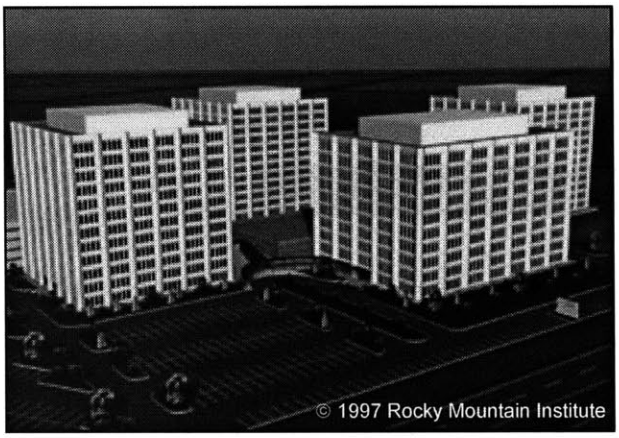


The early planning stages of the project present the greatest opportunity to maximize energy efficiency and minimize development costs.[13] Figure 5.2 illustrates the magnitude of potential savings and the architectural and engineering effort required to achieve those energy savings at different points throughout the building's lifecycle. Once the contract documents are drafted, changes in system selection and sizing can have significant, negative impacts on the project budget, often increasing development costs to a point where green elements become unattractive investments despite longer-term benefits. Furthermore, if environmentally sensitive elements are added

individually instead of dynamically integrated with other building systems, energy efficiency may improve but will fall short of a building-wide energy efficiency design. If developers are intent on truly maximizing the financial and efficiency advantages of commercial green buildings, the consultants and the design team must be involved at the project's onset.

Convincing Traditional Skeptics

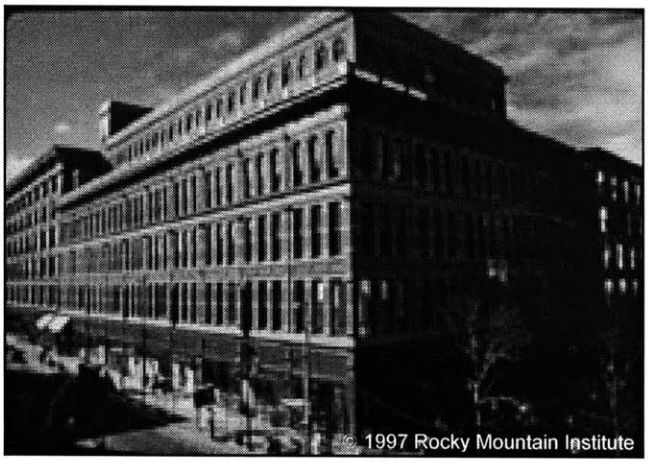
No matter how rational and convincing the argument for an inclusive development process, traditional development skeptics remain. Claiming this process only works well in the abstract or on paper, developers are often unaware of projects where the process of visioning and dynamically expanding the development team to address different phases of development have added value. The most direct method of conveying the value of a participatory process is to review finished green projects.



The MERITT Alliance, a commercial green property consortium, expanded their internal development team to include specialists who understood the interrelationships between building systems before replacing the HVAC systems in their Continental Office Plaza near Chicago, Illinois. Instead of just replacing the HVAC systems, MERITT took an intelligent, integrated approach and underwent a major lighting system overhaul which allowed them to downsize their mechanical systems and sell the resulting energy savings to outside investors.[14] The integrated approach reduced the payback period of the conventional HVAC system from 111-years (HVAC system replacement) to only 1.7-years (integrated systems redesign). While other building owners would have just replaced the system, MERITT gained a clear competitive advantage by addressing the HVAC expenditure as a integrated building systems opportunity instead of a mere system replacement.

At a larger scale, Civano, an 820-acre development that will include 1.3-million square feet of commercial space, is the nation's first large-scale development project to incorporate sustainable design as a major development objective. More impressive than the size of the project, the distinguishing characteristic of Civano is the approach the development team took in creating a shared vision for the project. Keeping the qualities of place, its residents, and the local jurisdiction in mind, the project team took an integrated look at the entire development and found ways to maximize project value to all stakeholders. This integrated approach is expected to save the

City of Tucson $500,000 per year on water, road, and landfill expenses; save citizens transportation costs, maintenance fees, energy costs, and environmental health costs; and save the developer the time costs associated with complicated approvals processes.[15] The project manager for the City of Tucson noted that by including local government and residents, they were able to minimize "citizen revolt" and expedite the approvals process.[16]



Finally, in 1994 Jonathan F.P. Rose and the Affordable Housing Development Company (ADHC) successfully redeveloped the Denver Dry Goods Building, an historic building built in 1888, into a vibrant mixed-use center. Although the building's energy efficient measures, strong mix of uses, and proximity to transit make it a green building financial success story, the developer's dedication to an inclusive process made the project possible. After numerous failed attempts by other developers, Rose coordinated 23 sources of financing, including partnering with the Denver Urban Renewal Authority, to form a development team that suited all parties' interests.[17] Using an inclusive, community-oriented process, Rose brought together the 40 attorneys representing the financing sources, local development officials, and community members. Cleverly coordinated, Rose delegated tasks to each member of the development team on behalf of the rest team and was able to streamline the process.[18] More significantly, by including the development officials and the community in the process from the beginning of the project, Rose and the ADHC fostered enormous community support for the project that helped secure funding, get approvals and code variance, and save on overall development costs.[19]

Notes

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Chapter 6

An Optimal Green Development Strategy in the Context of Industry Barriers

A summary of the points made in earlier chapters, this final chapter presents green development guidelines aimed at maximizing the green development financial opportunities identified earlier. Placing these project-level guidelines in context, this chapter concludes with an informed look at the industry forces—as both impediments and opportunities—in the mainstreaming of green development.

An Optimal Approach: Guidelines for Cost Saving Maximization

The four cost saving strategies reviewed in this paper, if combined, could yield financially significant outcomes. Environmental building design strategies provides the developer with the most control over energy and development savings and may provide additional operating revenues through productivity performance leasing. Environmentally efficient siting and urban design strategies may serve to insulate building owners from small economic shocks in adjacent space markets, reduce infrastructure and development costs, and allow owners to charge a premium for conveniently located space.[1] Incentive programs provide developers and owners with information and services that have the potential to improve the design of the building and educate the owner about green features. Finally, maximizing design, land use, and incentive program savings, integrative development processes bring together technical experts and people with a social stake in the project to whole systems engineer the project and minimize project frictions. Summarizing the findings in this paper, the following are guidelines that together form an optimal approach for implementing environmentally sensitive cost saving mechanisms in the development of commercial green buildings.

Environmental Building Design

- **Design Buildings with high indoor environmental quality (IEQ).** Choose building systems and materials that promote worker health and productivity, reduce absenteeism, and lower owners' liability risks associated IEQ. Incorporate systems that address spatial comfort, acoustic control, and thermal comfort.

- **Select systems and materials in concert.**
  Approaching the building from a whole-systems engineering perspective, select HVAC and glazing systems that are complimentary, thus minimizing the load on the HVAC system (resulting in a smaller, less expensive systems). Design systems to reap the maximum benefits from an integrated development process.

- **Seek clients that understand the mutual advantages of performance leases.** While capturing the value of increased worker productivity has been traditionally limited to tenants and owner-occupants, propose alternative lease structures that share the advantages of environmental building design and high IEQ.

Site and Urban Design

- **Site buildings in high-density areas.**
  Commercial developments should be sited in areas of high density to satisfy tenant demand and take advantage of a pre-existing real estate market, a resident employee base, and close proximity to business amenities.

- **Site commercial projects in mixed-use districts.**
  A mix of uses adjacent to commercial properties uses developed areas more efficiently by programming different uses for different times of the day. If the uses in the district or project are carefully selected, developers can benefit from efficiencies in the operating of mechanical systems and parking facilities. Additionally, commercial developers can lower their income risk by diversifying income streams across a mix of uses that operate at different times throughout the day.

- **Select sites served by mass transit.**
  Developing sites served by mass transit reduces the need for people to drive when commuting or making daily trips. From a development perspective, scaled-down on-site parking requirements free up land for income producing development and reduce maintenance and development costs associated with excessive parking facilities.

- **Undertake redevelopment and infill projects.**
  Infill and redevelopment projects maximize the use of in-place infrastructure and can minimize development costs associated with trunklines. The combination of the ability to reuse infrastructure and the market benefits of locating within a pre-existing urban environment make infill and redevelopment projects attractive prospects.

- **Approach the due diligence process as an opportunity to minimize risk.** Developers can limit risks associated with zoning restrictions, plan approvals, site remediation, and financing through site investigation and preliminary project collaboration during the due diligence phase. Working with technical consultants, city officials, and financiers, developers have the opportunity to understand and evaluate site possibilities, potential risks, and eminent challenges to the project before they become committed.

Incentive Programs

- **Use programs to support a green development program.**
  Within reason, incentive programs are a viable source of project savings despite potential difficulties and challenges. As experienced green developers will agree, the decision to undertake green projects should rely on the asset-level financial fundamentals and an environmentally sensitive vision for the project.

- **Target technical assistance programs.**
  Technical assistance programs offer developers with a variety of services that often comprehensively address energy savings. Potentially more valuable than financial programs, technical programs assist developers in designing buildings and integrating building systems with post-occupancy performance goals in mind.

- **Do not depend on financial incentive programs.**
  Financial incentive program funding is subject to a variety of conditions and may dissolve as program funds become depleted. Furthermore, financial incentive programs may disappear altogether in light of more stringent environmental development policy and code restrictions targeting building related illness or energy waste.

- **Include program representatives at the earliest stage possible.**
  By including program representatives early in the development process, developers can ensure they work in concert with the design team. Program representatives can improve the performance of the design team by setting appropriate building performance benchmarks in the drafting of performance based fee contracts (PBF).

Integrative Development Processes

- **Front load the development process to maximize cost saving potential.** Using the creation of a shared vision as a basis for project decisions, a development team representing a variety of interests can minimize development costs by thinking about the project as an integrated series of building systems and features geared toward explicit performance benchmarks (e.g. quality of place, resource consumption).

- **Include parties to create project support, reduce friction, and ground project.** Instead of working against local development authorities and citizen groups, make them part of the process and press them to articulate their project requirements, concerns, and expectations. Involving citizens and local development officials can save time, resources, and may often provide approvals flexibility and reduce marketing costs.

- **Execute contracts that converge contractors' and owners' interests.** Implement performance based fee (PBF) contracts that make the design team and contractors responsible for the quality of their architectural, engineering, and construction services. Extending this concept to areas beyond building performance issues, similar contracts could be drafted to ensure construction site waste recycling and energy efficiency.

Fits and Starts: Impediments and Catalysts in the Mainstreaming of Green Development

The findings in the previous chapters present a rational, cost saving argument for developers to adopt green development strategies. As a primary objective of developers and building owners is to maximize revenue and minimize development and operating costs, the cost-saving green development approach should be standard industry practice instead of a current industry niche. If the cost savings identified herein are real, why hasn't mainstream development gone green? Furthermore, assuming green development approaches can result in assets that are more valuable, cost less to build, are in higher demand, and will enjoy longer lifecycles than their conventionally developed counterparts, what is it going to take to get conventional developers to become green developers?

This chapter ends by addressing both of these questions. A synthesis of over 20 interviews with developers, architects, and development industry professionals, this discussion attempts to tackle the difficult questions of why green development is not mainstream practice and how the mainstreaming of green development might happen.

Impediments to the Mainstreaming of Green Development

The cost savings identified in previous chapters are real. Supported by hundreds of case studies, the financial opportunities green development present *should* inspire widespread industry adoption. However, despite the advantages of green development outlined in previous chapters, mainstreaming is not happening as fast as would be expected. Are developers unaware of the advantages of green development savings or are there other roadblocks to practicing green development?

In talking with industry professionals about green development opportunities and thinking about how different industry players have traditionally operated, there are hurdles to green development beyond those identified in earlier chapters—obstacles and forces rooted in the real estate industry. These impediments are tied to standard industry practices and conventions and do not surface in case study analyses, nor do they necessarily arise out of talking to developers and investors. Rather, these issues appear only after stepping away from green development to think about the motivations and concerns of industry professionals—from a real estate, not a green development perspective. The following issues impede the mainstreaming of green development.

- **Real estate is full of agency problems.**
  The development of green commercial buildings requires more up-front effort, and potentially more up-front costs, than their conventional counterparts. More than compensating for additional effort and costs, many of the financial advantages of green development come from operational savings. Considering these cashflows, fee-based developers, or developers who limit their business focus to the practice of developing without long-term investment, have few incentives to adopt a green development approach. Currently, the real estate investment trust (REIT) industry is perpetuating fee-based development. In developing new properties, REITs often contract-out for development services though a competitive bidding process. The developer who promises to deliver the project at the lowest cost is awarded the contract—often regardless of the post occupancy operating costs. Because green projects involve more effort and are often initially bid with higher-first costs, green development approaches are unattractive to fee-based developers. If investors continue to favor REITs exclusively focused on asset management, fee-based developers have few incentives to adopt a green approach. Unless specified by REITs and supported by investors, the motivations of fee-based developers are a major hurdle to mainstreaming green development.

- **Green development is perceived as risky.**
  Many investors evaluate green building systems and processes as "bleeding edge," or risky. As a result of this labeling, investors often favor conventional building systems and processes over green systems and processes because they believe the risks involved with conventional buildings are understood and calculable. This is a major point of frustration for green development advocates, as most green projects incorporate more simplified building systems than their conventional counterparts. In reality, while green projects are perceived as risky, they are more secure long-term investments.

- **Real estate investors confuse myopic and rational behavior.**
  Real estate investment has typically looked to past projects to understand how to plan and construct future projects. The processes and systems that have proved successful are often improved upon and replicated in future projects. Unsuccessful techniques and systems are usually discarded. This deductive process typically leads to over-engineering systems considered successful in previous projects and limits the introduction of new development approaches, such as green development. Instead of looking to the future to understand and anticipate how the industry might change (policy, demand, etc.) and how this could effect real estate investment, investors', in an attempt to be fiscally prudent, fall into a myopic, deductive trap.

- **People complicate the development process.**
  Consider the conventional developer operating a company that she inherited from her great-grandfather. For over a century her family has been successful by following a standard approach to development: identifying a need, finding a site, arranging financing, contracting for design and construction, executing leases, and quickly selling. Through this rather insulated development process, she usually only has to communicate with architects, investors, code officers, lawyers, and brokers. She is in complete control of the conventional process. Now consider how she might react when presented with the concept of introducing a variety of technical consultants, local citizen groups, prospective tenants, and the municipal development authority in addition to her usual contacts in a collaborative forum early in the design stage. She is not going to be too open to expanding the development team and temporarily suspending even a small amount of project control. Despite the immense opportunity to maximize cost savings, many conventional developers fear that an integrative design process will complicate a process they feel needs no changing.

- **The "net" lease structure prohibits investment in green measures.** The most common leasing arrangement in commercial properties is the "net" lease. Under the net lease structure, property owners "pass-through" all operating costs to tenants and collect only a base, or net, space rent. The net lease environment impedes the implementation of green development strategies because the owner is responsible for financing the green improvements but is usually unable to profit. Tenants directly benefit as a result of lower operating costs, which may increase demand because their total space costs are lower, but owners have no way of capturing the costs savings they finance. Most standard net leases allow owners to pass-through a few "standard" capital improvements to tenants, but are not designed to allow owners and tenants to share in both the costs and the benefits of "deep retrofit" green development strategies. Until such a time lease structures that focus on "effective rent" or gross space costs prevail in the commercial sector, the simplicities of the "net" lease structure will impede owners to adopt green development approaches.

- **A successful status quo has made the industry change averse.** With the exception of a few technological advances, there have been few changes in the processes by which projects are planned and built. Through the use of this conventional process, barring industry downturns, the real estate development industry has enjoyed a financially successful history. Industry professionals are reluctant to change a development process that has historically worked well. To change the way buildings are built requires industry professionals take the time to learn new skills and new development processes. Thus far it has been difficult to convince developers and investors to take time out from what has worked well in the past to learn new a new development process.

- **A <u>perceived</u> lack of demand retards mainstreaming.** In interviewing industry professionals that tenaciously adhere to conventional development practices, some commented that the demand for green development is so small that the market is already saturated. Some go on to say that if the demand for green projects were stronger, there would be more green projects. While these comments sound reasonable, they incorrectly imply that existing markets spark innovations instead of the other way around. Consider, for example, the history of umbrella partnership real estate investment trusts (up-REITs). In the early 1990s, the up-REIT structure was created to give real estate owners the security and liquidity of publicly traded assets without the transaction costs of liquidating their distressed real estate holdings. Prior to the up-REIT innovation, no market existed. The up-REIT structure created a market where real estate owners could contribute distressed properties in return for liquidity and security. Similarly, the green development approach can create a market where real estate owners can reduce operating costs,

avoid liability and future code mandates, and decrease lifecycle costs in return for undergoing an integrative development process. Real estate professionals' oversimplifications of the relationships between innovations and market demand continue to retard the mainstreaming of green development.

Catalysts in the mainstreaming of Green Development

While the above forces inhibit the mainstreaming of green development, the potential for widespread industry adoption remains—under certain conditions. Some entrepreneurial developers have already done research, identified cost saving opportunities, and incorporated green development strategies in their practice.

An industry-wide adoption, however, may require more than a project-level cost saving argument. Strategies to make green development standard industry practice, as opposed to individual practice, must address the industry obstacles to mainstreaming green development. The points below are suggestions as to how green development could achieve mainstream industry acceptance in the near future.

- **Agency problems must be addressed.**
  As a prerequisite for mainstreaming, the real estate industry must address the fundamental agency problems outlined earlier. If REITs continue to grow and, as their primary procurement method, fee-based developing increases, the industry must find ways to align developers' and owners' interests. In the case of REITs, it is likely that investors will eventually understand that fee-based developing can result in sub-optimal products. Building owners can directly ensure developers are interested in creating lasting, efficient buildings at the lowest total cost, not just lowest first costs, by requiring developers contribute long-term equity to the project. In the case of developers who "flip" properties, or develop buildings and quickly sell upon completion, tax regulations could be drafted to encourage long-term ownership. Finally, overcoming the issues associated with the net lease structure, owners should draft leases that focus on offering their tenants market rate "effective rents" and capitalize on the operating efficiencies owners create.

- **Mandatory code compliance may lead to mainstreaming.**
  If the direction and momentum driving development regulation persists, the adoption of selective green building systems may be a requirement instead of a choice. As regulatory agencies and policy makers enforce more stringent indoor air quality (IAQ) requirements on buildings, owners and developers will quickly come to understand that IAQ is related to a host of building systems. Looking for ways to capitalize on the costs of

meeting new IAQ requirements, owners will realize that the only way to get the maximum benefit from the installation of one green system is to approach each building as an integrative design project. In effect, while increasing IAQ may initially be a costly burden to developers and owners, the search to find off-setting, cost saving strategies may lead developers to adopting a whole-systems, integrative process.

- **Fear is an effective motivator.**
  Building owners undertaking costly retrofits as a result of lead and asbestos findings, ADA requirements, and sick building syndrome, will agree that it is less costly to be ahead of the curve than on it. As development policy discussions related to indoor health concerns continue and owners are increasing found guilty for their tenants building related illnesses, owners may begin to think differently about green development. Most building owners and developers do not aspire to be associated with the term "defendant" in large, well-publicized liability disputes. Although it has not happened yet, developers and owners may choose a green development approach in order to avoid costs associated with conventional buildings.

- **Build-to-suit tenants are breeding smarter developers.**
  Some developers simply do not understand how to undertake green projects and—unless forced to learn—do not want to take the time to learn. Large tenants are providing valuable education for conventional developers by requiring their build-to-suit projects be inclusively developed and environmentally responsible. Major companies such as Sun Microsystems, the GAP, and Sprint telecommunications have required developers to incorporate stakeholders at all levels to understand how buildings should be sited and designed and how they should perform. By requiring developers to undertake inclusive processes, build-to-suit tenants are educating developers on the benefits of green development. At the same time, developers are crafting efficient development strategies to meet tenant requirements and maximize development profits. A strong build-to-suit sector promoting green development could be a viable avenue to greening the real estate industry.

- **Demonstration projects can dispel green development myths.**
  The careful study and documentation of green development demonstration projects can potentially demystify the risks investors associate with green projects. As mentioned earlier, many investors prefer to accept the potentially higher calculable risks and lifecycle costs associated with conventional development over the lesser understood risks and costs associated with green development. Demonstration projects can be used to provide investors the data they need to appropriately evaluate green projects against conventional projects. If

used correctly, the opportunity to better compare conventional and green projects can lead to increased industry demand for green projects.

- **Capitalism is a catalyst.**
  Despite the green development impediments identified in the previous section, the potential for cost savings could be enough to inspire widespread industry adoption. As exemplified by Equity Office Property Trust's interest in energy efficient buildings and the development of a Hines Development Company energy-efficient prototype for future Hines office projects, there are significant financial advantages to green development. Considering the real estate industry's agency problems and a misunderstanding of the risks associated with green development, a mainstream movement driven by cost savings may be a slow process relative to other catalysts. Nonetheless, some developers and owners already understand that the cost saving opportunities commercial green developments present are significant and, at this point on the eve of a broader industry acceptance, could provide them with a competitive advantage.

Final Thoughts

This thesis presents the beginnings of a green development rationale targeting the real estate community. It is conscious that this discussion ends with little mention of the impacts of commercial development on the natural environment; science continues to amplify an environmental justification to rethink conventional real estate development and operation. Environmental scientists, however, are off target—a financial rationale is needed to mainstream commercial green development. Real estate industry professionals are concerned with the risks of adopting a new development paradigm over a tried and true method for what has historically been a successful business strategy.

Commercial real estate, more than any other sector, has the highest potential to increase net operating incomes and asset values as a result of implementing innovative environmental technologies and processes.[2] Designing commercial properties that are sensitive to employee health and comfort, environmental building design can increase productivity and boost annual revenues for both landlords and tenants. By siting buildings in high-density, mixed-use districts served by transit, development and infrastructure costs can be reduced while market security and demand are increased. Taking advantage of programs and policies that support green commercial development, developers and investors are privilege to in-kind technical support and consulting, capital and operating rebates, and new and often exclusive access to capital. Finally, and a paramount finding of this thesis, approaching a commercial project as an integrated combination of systems maximizes total cost saving opportunities. Beyond incremental savings, due to for example high performance lighting and environmentally efficient siting decisions, the integrative development process can create a development synergy that can optimize financial savings commensurate with environmental building performance.

It is clear that as more green development techniques are employed in commercial development, data collection and financial analysis are necessary to overcome many of the industry impediments that currently constrain green development to a niche market. The removal of the barriers identified in this chapter will facilitate industry adoption. Further research should be directed toward understanding how to restructure the real estate industry to accommodate non-conventional development approaches.

Despite its slow and cautious beginnings, the green development market is expanding. As more and more financial benefits are identified, approaching commercial development from a green development perspective may soon become a competitive necessity rather than a competitive advantage.

Notes

[1] Jonathan F.P. Rose, "Green Development Case Study Questionnaire," Denver Dry Goods Building Project Reference File, (Snowmass: Rocky Mountain Institute, 1996): 3, 7.

[2] Christopher Trevisani, "The Effects of Environmental Technology on Real Estate Development—How to Increase Asset Value Through the Implementation of Innovative Environmental Technology." Master's Thesis, (Cambridge: MIT, 1998): 62.

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Green Realities: The Financial Opportunities of Environmentally Sensitive Development in the Commercial Real Estate Industry

End Matter: List of Green Development Case Studies Reviewed
Complete References

List of Green Development Projects Reviewed

Project Name	Location
Amoco Oil	Tulsa, OK
Ashton Elementary School	Sarasota, FL
AT&T	Columbus, OH
Audubon House	New York, NY
Bank of America	Washington, D.C.
Bell Atlantic	Richmond, VA
Boeing	Renton, WA
Boston Park Plaza	Boston, MA
University of California at Berkeley	Berkeley, CA
Civano	Tucson, AZ
C.K. Choi Building for the Institure of Asian Research	Vancouver, Canada
Compaq Computer Corporation	Houston, TX
Cox Newspapers/Georgia Power/The Trane Co.	Atlanta, GA
Denver Dry Goods Building	Denver, CO
Herman Miller SQA	Zeeland, MI
Hyde Tools	Southbridge, MA
Inn of the Anasazi	Santa Fe, NM
International Netherlands Group Bank	Amsterdam, the Netherlands
James Forrestal Building, DOE	San Francisco, CA
Johnson & Johnson	Fort Washington. PA
Lockheed Building 157	Sunnyvale, CA
Longs Drug Stores	Hilo, HI
Marriott Marquis Hotel	New York, NY
Massachusetts Institute of Technology	Cambridge, MA
MERITT Continental Office Plaza	Chicago, IL
National Audubon Society Building	New York, NY
Nike, Inc.	Wilsonville, OR
Norm Thompson Headquarters	Portland, OR
Pennsylvania Power & Light	Allentown, PA
City of Phoenix's Energy Management Program	Phoenix, AZ
The Presidio / Letterman Digital Arts Center	San Francisco, CA
Provo, Utah's City Hall	Provo, UT
Reno Post Office	Reno, NV
River Place	Portland, OR
The County of San Diego	San Diego County, CA
San Diego Union-Tribune	San Diego, CA
City of San Francisco	San Francisco, CA
Shell Oil	Anacortes, WA
Southern California Gas Company's Energy Center	Downey, CA
Tennesse Valley Authority	Knoxville, TN
United Airlines Maintenance and Operations Center	San Francisco, CA
U.S.X. Corporation/ U.S. Steel Group	Gary, IN
The Univ. of Victoria Engineering Laboratory Wing	Victoria, Canada
VeriFone Worldwide Destribution Center	Costa Mesa, CA
Wal-Mart	Lawrence, KS
Washington Times	Washington, D.C.
West Bend Mutual Insurance	West Bend, WI
2211 West Fourth Avenue	Vancouver, BC, Canada
World Trade Center	New York, NY

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